

NOVEMBER 1, 1948

9

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• PASSENGER CARS • MOTOR TRUCKS • BUSES

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and the Tooling for Its Production**

1949 Nash with New Bodies and Airflyte Styling

"Necked" and "Waisted" Screws and Bolts

Cutting Piston Inspection Costs in Half

Worker Output Under Socialism in England

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Irons out trouble on a heavy steel job...

Stanicut 309 BCS

The material: S.A.E. 1010 steel, 9 gauge.

The job (see photographs):

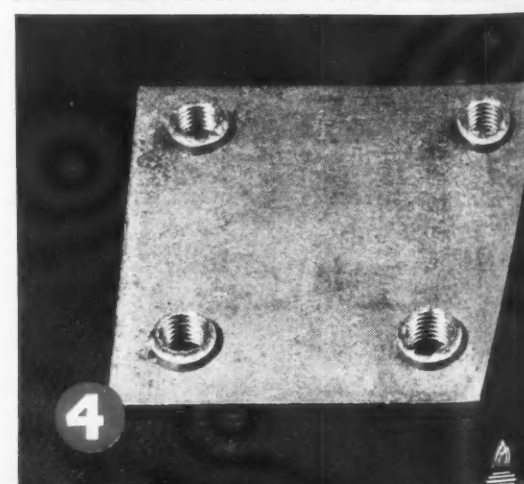
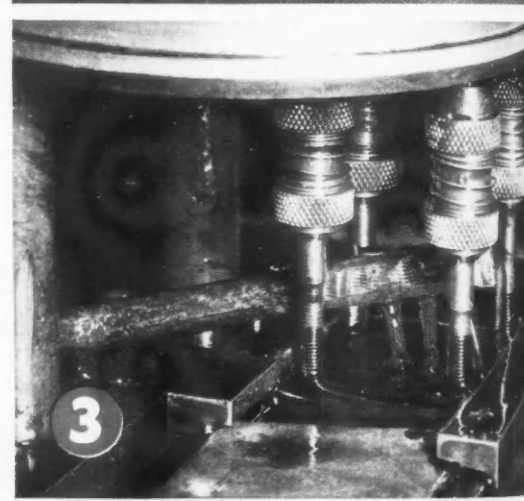
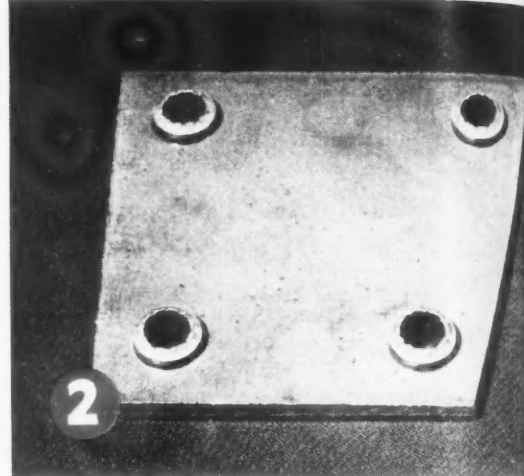
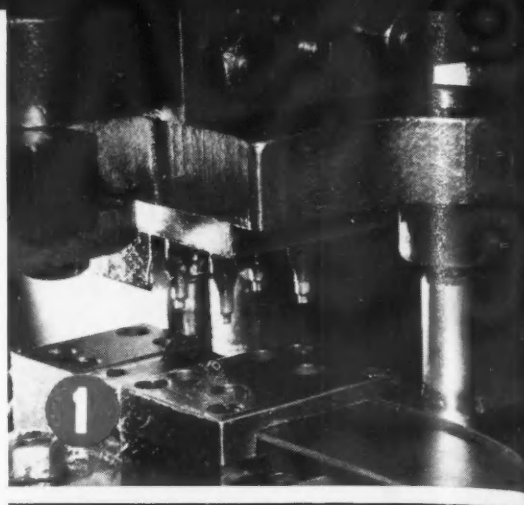
- ① Drawing and punching angle template, in one operation, produces
- ② a blank with four flanged holes.
- ③ A tapping operation completes
- ④ the finished plate.

When first set up, this job caused no end of trouble for a midwest metalworking plant. Holes could not be held to proper size because of excessive loading on the punches and the drawing dies. On the tapping operation, threads were stripped or torn and taps had to be changed frequently.

Various oils and compounds were tried on this job. None produced the desired improvement until a Standard Cutting Oil Engineer was asked for a recommendation. He analyzed the operation and decided that an oil of high sulfur and chlorine content was needed. He suggested Stanicut Oil 309 BCS.

With this oil a highly satisfactory production rate was obtained. Loading of the punches and the forming die stopped completely. Holes were held to uniform sizes. Believe it or not, as many as 6,000 plates have been produced before taps were changed.

If you are having trouble with a new machining or stamping operation, call in a Standard Cutting Oil Engineer. He can help you select a cutting oil that will give the best possible tool and production performance. If your plant is located in the Middle West, write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois, to secure the services of the engineer nearest you.



STANDARD OIL COMPANY (INDIANA)

STANDARD

AUTOMOTIVE INDUSTRIES

Published Semi-Monthly

November 1, 1948

Vol. 99, No. 9

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AUTOMOTIVE INDUSTRIES, November 1, 1948

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Large capacity, efficient heat transfer, and sturdy construction are features of Young automotive cooling systems. Manufacturers of mammoth earth moving and road building machinery, like that shown above, know that Young-engineered equipment is designed to maintain optimum engine temperatures under the most strenuous duty, and is built to provide long-lasting, economical service.

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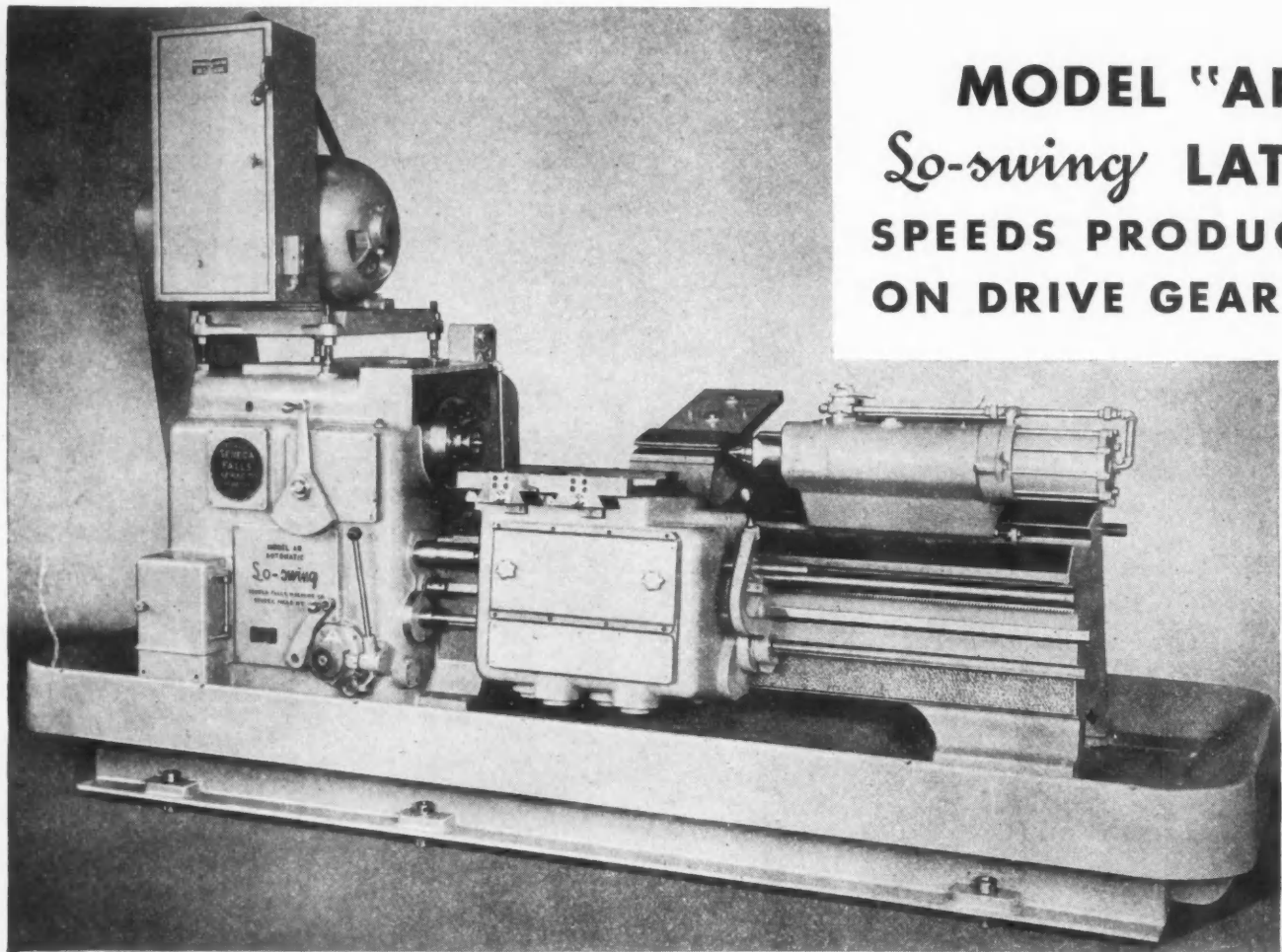
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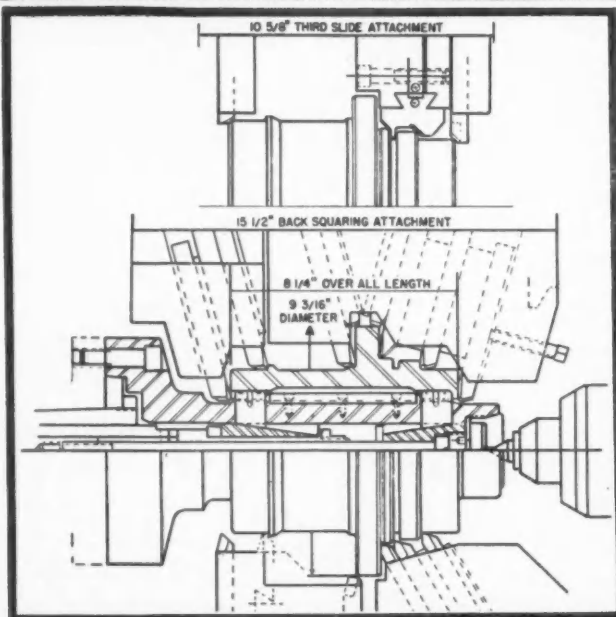
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MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-swing PEOPLE" SENECA FALLS, NEW YORK



MODEL "AR" Lo-swing LATHE SPEEDS PRODUCTION ON DRIVE GEAR HUBS



Problem: To automatically turn, face and chamfer shoulders, and cut groove on Gear Hub with 9" Flange diameter, locating and centering from bottom of spline previously machined.

Solution: The Model "AR" Automatic Lo-swing Lathe was selected for this job due to its rigid construction and its demonstrated fine performance with cemented carbide tools.

The expanding, air-operated driver, shown in the line drawing and the main illustration, is fitted with two sets of six driving jaws which accurately center the part true with the bottom of the splines. The jaws are actuated with two independently expanding bushings and pull bars which equalize the pressure on both sets of jaws. The parts are located longitudinally on the arbor by an automatic, air-operated locator, which moves forward to the exact locating position when the tailstock spindle is withdrawn and relieves when the spindle is advanced.

All diameters are turned with the tooling mounted on the front carriage slide. The squaring, chamfering and grooving operations are divided between the rear and vertical slides in order to simplify the tooling which is used for several different sizes of hubs. The line drawing shows the tooling in detail.

Consult our Engineering Department for Automatic Lo-swing Lathes engineered for your particular turning problems.

SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.

PRODUCTION COSTS ARE LOWER WITH Lo-swing



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AUTOMOTIVE INDUSTRIES

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High Spots of This Issue

1949 Nash Models

The new 1949 Nash models are signalized by Airflyte styling, new bodies, important engine changes, a new Uniscope instrument cluster which has been mounted on the steering column jacket, and torque tube drive, all detailed in an article which starts on page 26.

New Diesel Engines Highlight England's First Show Since 1937

Of important interest to AUTOMOTIVE INDUSTRIES' readers is W. F. Bradley's account of the British Commercial Motor Transport Show which featured a new lightweight six-cylinder Diesel engine by the Foden Co., together with other new Diesel engines, on page 30.

Overhead Valve V-Eight Powers 1949 Cadillac

Cadillac's new cars feature a high-compression V-eight overhead valve engine with five main bearings and improved hydraulic valve tappets. Although this new power plant develops 160 hp, it is smaller and lighter than the former Cadillac engine. A well-illustrated article describing the 1949 Cadillacs begins on page 34.

"Necked" or "Waisted" Screws and Bolts

Limited in use for the most part to aircraft-type engines, "necked" or undercut studs, screws and bolts have advantages which are fairly well known. P. M. Heldt explores the possibilities of these screws and bolts in the field of engine production in an article beginning on page 42.

First of IHC Nation-Wide Chain of Truck Rebuilding Plants

The International Harvester Co. has started operations at its recently established truck rebuilding plant in Richmond, Calif. The first of several such plants that IHC intends to establish throughout the U. S., it is described on page 44.

26 New Product Items And Other High Spots, Such As:

Worker output under socialism in England; cutting piston inspection cost in half; the opening of a new Chrysler parts plant; automobile excise tax reduction unlikely next year; and smaller tires and more efficient brakes for the B-29 bomber.

*News of the Automotive Industries, Page 17
For Complete Table of Contents, See Page 3*



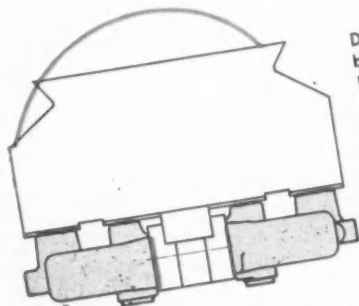
Close-up of right-hand fixture showing work in broaching position. Two finished parts are on top of the fixture.

Shocks get their Hydro-Broach treatment at the rate of 465 per hour

● Shock absorber bodies for a well-known make of car had to be machined on surfaces at right angles to each other. Cincinnati Broach Application Engineers, to whom the job was submitted, were quick to see a low cost production possibility. By mounting right-hand and left-hand parts abreast, both parts could be broached at one time. (See drawing below.) And to help the operator maintain a high rate of production, the fixtures were designed for hydraulic operation. Close-ups of the Cincinnati engineered equipment for this job, mounted on the machine—a CINCINNATI No. 10-66 Vertical Duplex Hydro-Broach—are shown here.

The operator can readily keep up with the continuously repeating machine cycle and produce 465 parts per hour.

High production or medium production, Cincinnati engineered equipment on CINCINNATI Hydro-Broach Machines will give you lowest cost per surface broaching operation. Our engineers are at your service. May we hear from you? Please include blueprint of part and all related information.



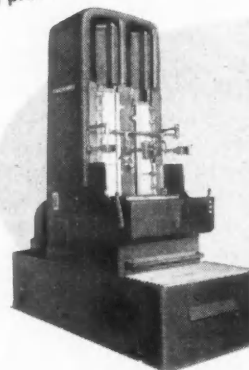
Drawing shows how right angle surfaces are broached on two parts at the same time.

Production data:
Part name Shock absorber body
Material Cast iron
Operation Broach cover and mounting pads

Stock removal $\frac{1}{16}$ "
Production 465 per hour
Equipment CINCINNATI No. 10-66 Vertical Duplex Hydro-Broach with complete tooling



Front view of CINCINNATI No. 10-66 Vertical Duplex Hydro-Broach, and tooling designed and built by Cincinnati for a high production broaching operation on shock absorber bodies.



CINCINNATI Duplex Vertical Hydro-Broach. Complete specifications may be obtained by writing for catalog M-1387-2.

THE CINCINNATI MILLING MACHINE CO.

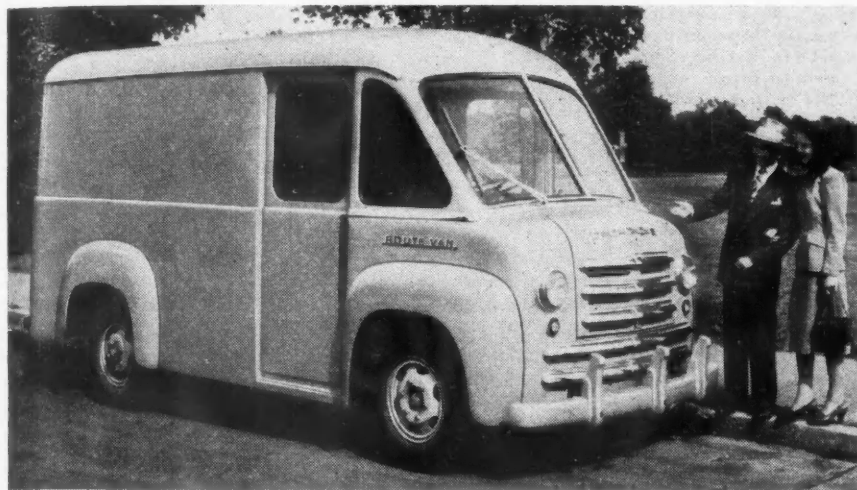
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NEWS *of the* AUTOMOTIVE INDUSTRIES

Vol. 99, No. 9

November 1, 1948



FLUID DRIVE FOR DELIVERY

The new Dodge Route-Van features fluid drive, and a differential assembly, mounted on the chassis frame, which drives the wheels through open-type axle shafts and universal joints. The DU model shown here has a 117-in. wheelbase, a 9.5 ft body, and is powered by a six-cyl., 102-hp engine. The new trucks are available in two different series of chassis and three body sizes.

1949 Buicks Now in Production

GM's Buick Motor Div. has started production of its 1949 models, scheduled to be announced to the public late this month. The Buick plant closed down for a short changeover on Oct. 20. The two larger Buick series, the Super and Roadmaster, will have new styling and some mechanical changes. The 40 series will continue in production for the rest of this year but will not be changed, and is not expected to be produced until sometime after the first of the year when a new body series will be ready for introduction.

GM Nine Months Output in '48 Tops 1.6 Million Units

Total production of automobiles and trucks by GM for the first nine months of this year was well ahead of the same period for 1947. The corporation built 1,621,043 units up to Oct. 1, compared with 1,372,650 for the same period last year. Production, however, was still behind the 1,865,410 vehicles built during the first nine months of 1941. Truck production is slightly ahead of 1941

with more than 381,000 units built in the first nine months of this year, about 10,000 more than for the same period of 1941.

Government Pushing Output of Cold Rubber

The government is getting behind the production of cold rubber which is said to give up to 30 per cent greater tread wear in tires. The RFC is planning to put \$3.5 million into an expansion program at government-owned rubber plants managed by private companies. The program will consist of installation of refrigeration equipment required to process the rubber at temperatures ranging down near the freezing point of water. Currently production of cold rubber is about 21,000 tons a year which is expected to rise to more than 180,000 tons annually when the program is completed.

The Goodyear Tire & Rubber Co. is planning a 50 per cent conversion of its synthetic rubber production facilities for the production of cold rubber. Goodyear expects to produce 45,000 long tons of cold rubber annually.

British Ford Making New Model, the Pilot

The Ford Motor Co. of England is starting production of a new model called the Pilot which will be powered by a Ford V-8 engine developing 85 to 90 hp. The chassis, however, has the same short wheelbase which has been used on the English Ford. According to Ford officials at Dearborn, the car is not produced especially for export to the United States as had been reported, but will be distributed in England and other countries as well as in America. The Ford company in France has also brought out a restyled version, powered by the Ford V-8, 60 hp engine used in the U. S. several years ago, and now improved to turn out about 70 hp.

GM and Ford Spokesmen Differ on '49 Output

There is apparently some difference of opinion in the automobile industry about the prospects for building more cars in 1949 than this year. Recently, E. R. Breech, executive vice-president of Ford, stated that allocations would deprive the industry of about 10 per cent more steel in the first quarter of next year and possibly even more during the second quarter. On the other hand, GM's thinking as indicated by Harlow H. Curtice, new executive vice-president, is that more steel may actually be available next year, permitting an increase of possibly 10 per cent in total production. Mr. Curtice said that he does not believe that allocations will be increased significantly during the next year, and that the steel industry has new capacity coming into production that will make more steel available. He also believes that pipelines of other goods may become filled next year making more steel available for automobiles.

Nash Boosts Prices on 1949 Models

Nash has raised the prices of its 1949 models an average of \$275 on the Super 600 series, and \$390 on the Super Ambassador series. The Nash line also includes a two-door sedan for the first

NEWS of the AUTOMOTIVE INDUSTRIES

time since 1941. The business coupe has been dropped from the schedule for the time being, but will probably be reinstated within the next few months. The soft top convertible is also not in production at present. The company points out that it has spent more than \$15 million developing its 1949 line of cars bringing to more than \$40 million the total expenditures since the war for additional plants, expansion, modernization, and new model development. Custom models are available in both series.

The Nash factory delivered prices for 1949 and 1948 including excise tax and other handling and retail preparation charges, but with transportation and state and local taxes extra, follow:

Super 600	1949	1948	Increase
Two door	\$1807	\$—*	\$—
Brougham	1829	1538	291
Four door	1832	1587	245

Super Ambassador	1949	1948	Increase
Two door	2254	—*	—
Brougham	2275	1858	417
Four door	2279	1916	363

* Not in production

Production of the truck which Nash has under development does not appear imminent, however, and it is believed that it will be several months before enough steel is available to start production.

Five New Models in Nuffield Changeover

The British Nuffield organization has announced five completely new models: the Morris Oxford, the Morris Six, the Morris Minor, the Wolseley Six-Eighty, and the Wolseley Four-Fifty. All five cars feature independent front wheel

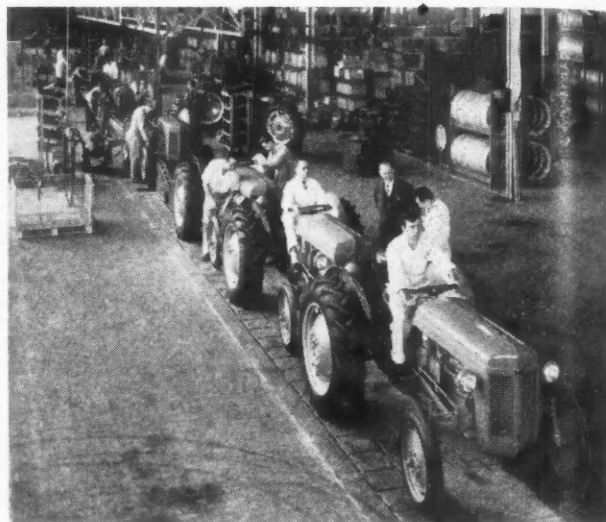


FIRST OF FIVE

One of five new Nuffield cars, the Morris Oxford, shown above, features independent front wheel torsion bar suspension and integral body and chassis. Now in full production, the new Oxford is powered by an L-head engine with 90 cu in. piston displacement.

FIRST OF THE FERGUSONS

The first Ferguson tractors are shown here rolling off the assembly line at the new plant in Detroit, built by Harry Ferguson, Inc., in the record time of 116 working days. By next March, output is expected to hit 250 units daily, and 500 units a day will be built on two eight hour shifts, it is expected when full production is achieved. The plant is located on a 72-acre site.



torsion bar suspension. The Morris Six is powered by a six-cyl engine with 134.2 cu in. piston displacement, while the Wolseley Six-Eighty is powered by an overhead camshaft engine developing 71 hp at 4000 rpm. The Wolseley Four-Fifty has a four-cyl overhead camshaft engine which develops 50 hp at 4000 rpm.

Ferguson Starts Tractor Output in New Plant

Harry Ferguson, Inc. has started production of farm tractors at its new plant in Detroit. Output is expected to reach 100 a day by Dec. 1 and 250 a day by next March 1. Capacity of the plant is 500 units daily on a two-shift operation. The company has a 72-acre site for expansion purposes if necessary, and says it may eventually build up to 3000 units a day with ex-

panded facilities. Harry Ferguson, founder of the company, announced that a new line of revolutionary farm implements is under secret development and will be introduced next year. He also revealed that a new labor-management plan will be introduced under which each employee will have a financial interest in the company. However, he did not divulge any details. Ferguson currently has 750 dealers and 27 distributors in the United States and Canada, and has orders on the books for 89,000 tractors. Currently, 1200 to 1500 units are being imported from England each month, and imports will continue until production from the Detroit plant is adequate to meet demand.

Fluids for Transmissions Face Standardization

With the number of automatic transmissions, fluid couplings, and torque converters increasing each year, the automobile and petroleum industries may face a standardization program to supply automobile owners with proper fluids, according to H. R. Wolf, assistant to the technical director of GM Research. He pointed out that transmission fluids are designed specifically for each particular type of unit and that manufacturers either recommend the use of approved fluids or supply the correct one as a service replacement part. Inferior fluids, he added, cause oxidation and varnish at relatively low mileage, and prevent the proper functioning of control mechanisms. He said that standardization will be necessary because the petroleum industry cannot be expected to supply a large number of different type and viscosity grades of fluid for all of the different models and types of automatic transmissions.

NEWS of the AUTOMOTIVE INDUSTRIES

Willys Delaying Plans for Passenger Car

Plans for a smaller lighter weight Willys passenger car still "are on the back burner," according to James D. Mooney, president and chairman of Willys-Overland Motors, Inc. He said that the company has a continuing program of development work covering a passenger car, but that present materials and plant capacity can be utilized with the present line of utility vehicles. Willys has currently eight separate vehicles in production, and tooling is completed on three others. Willys is doing better financially than it has at any time for more than 20 years, according to a preliminary estimate by

is sponsored by the standardization group or groups of each of the countries concerned.

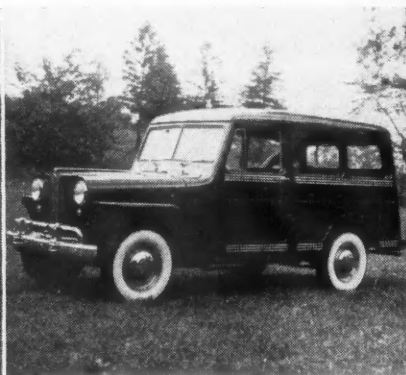
New Four-Engined Personal Plane Flown

Making its first flight at New Orleans recently, a new five-place personal plane, the Star Flight, powered by four 85-hp Continental engines driving four Sensenich fixed-pitch pusher propellers, is believed to be the first of its kind to fly in the U. S. Announced by Monsted-Vincent Aeronautical, Inc., the new plane is of all-metal construction. It has a gross weight of 4800 lb, a wing span of 48 ft, a length of 34 ft, and it cruises at a speed of 145 mph.

gine-building division of the Curtiss-Wright Corp., that they have been flight testing the huge new Wright Typhoon T-35 gas turbine engine in a modified B-17 Flying Fortress. The new engine, equipped with four-bladed Curtiss Electric propellers, was mounted in the nose section formerly occupied by the bombardier.

O'Malley Is New Chrysler General Sales Manager

Joseph A. O'Malley has been made general sales manager of the Chrysler Div., Chrysler Corp. He succeeds Stewart W. Munroe who has resigned to enter private business. Roy H. Ap-



WILLYS ADDS A TRIO

These three new additions to the Willys-Overland Motors line were disclosed by the company recently at its third annual Institutional Day. Shown at the left is the new Jeep Utility Wagon which with rear passenger seat and overdrive eliminated is a simplified version of the Jeep Station Wagon.

The Jeep Six Station Wagon, shown in the center, is powered by the new Willys six-cyl, 70-hp engine, and has a solid body color instead of simulated wood panels. The new Jeep four-wheel-drive Station Wagon at the right, has a selective two and four-wheel drive.

A. J. Wieland, executive vice president. Profit for the 1947 fiscal year ended Sept. 30 is expected to exceed \$6 million, double the 1947 fiscal year earnings, and highest since 1926. The total production for the first nine months of this year was 102,870 units.

U. S., Britain and Canada to Standardize Nuts & Bolts

The culmination of 30 years' work, an agreement between the United States, Great Britain, and Canada standardizing nuts and bolts appears to be very close. It is expected that representatives of the three governments will meet at the Bureau of Standards in Washington on Nov. 18, and it seems extremely likely that final agreement on the standardization will be reached then. These agreements will not be in the form of a treaty, but will be based on separate documents, each of which

No Contracts for Military Vehicles Granted as Yet

Although there has been considerable discussion about impending military vehicle contracts, so far as is known none has been granted to any automobile manufacturer. It is believed that with initial interest of the armed forces concentrated on four-wheel drive units of the one-quarter-ton Jeep type and the three-quarter-ton size that early work would go to Dodge and Willys, the only two companies producing that type of vehicle at present.

Wright Tests New Gas Turbine in B-17

The mystery surrounding a so-called five-engined plane, which has been droning over the East in recent months, has been cleared up with the disclosure by the Wright Aeronautical Corp., en-

pleman has been promoted from sales director to assistant general sales manager to fill the vacancy caused by Mr. O'Malley's promotion.

Selling English Fords Throughout U. S.

The demand for English-built Ford cars has been so great that distribution has been extended from the Atlantic Coast area to various points throughout the United States. J. R. Davis, Ford vice president and director of sales and advertising, reports, that dealers have requested more than double the 6000 units previously planned for importation. More than 2000 cars have already been delivered to customers in the U. S., and franchises to handle the cars are being extended in major cities through the country. Two passenger cars, the Anglia, a two-door, four-passenger

NEWS of the AUTOMOTIVE INDUSTRIES



British Combine

IMPROVED EXPORT

Featuring independent front wheel suspension, the new Hillman Minx, the British Rootes Group's latest export bid, is powered by a four-cyl, 35-hp engine. The new car with an improved integral body and frame construction has a wheelbase of 7 ft, 9 in., and a height of 5 ft. In the rear, left to right, are Sir William Rootes, chairman; B. Winter, engineering director; Sir Reginald Rootes, vice chairman; and E. W. Hancock, production manager.

sedan and the Prefect, a four-door model, are available in addition to a light panel truck called the Thames Van. All models are powered by a four-cyl, 30-hp engine.

Nash's California Plant In Production

Further evidence that the West Coast is fast increasing in importance in automobile manufacturing is seen with the announcement by the Nash-Kelvinator Corp. that its El Segundo, Calif., assembly plant is now in production. Building the first Nash cars said to be produced outside Wisconsin, the new plant includes about 500,000 sq ft of floor space and is located on a 30-acre tract. When capacity production is achieved, it is expected that the El Segundo plant will be producing over 25,000 automotive units annually.

AMA Highlights Postwar Automobile Output

The automobile industry during the past three years has produced almost 12 million vehicles, according to the AMA. In its current issue of *Automobile Facts*, the association reviews the uphill battle with labor stoppages and material shortages which have ham-

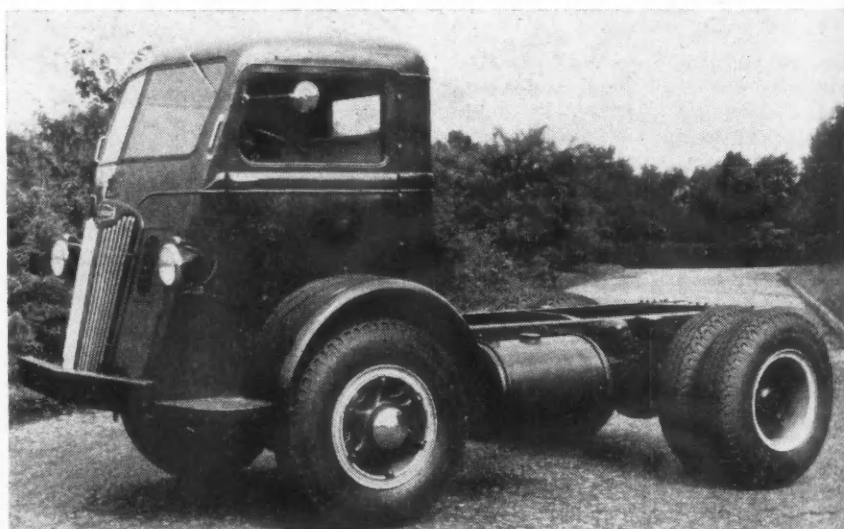
pered production and sent production costs soaring during the 36 postwar months ending Oct. 1. According to the tabulation, the industry turned out 8,547,700 passenger cars and 3,341,700 trucks and buses for a grand total of 11,889,400 vehicles. Although the aver-

age of nearly four million vehicles a year is very near the prewar level, the industry could have turned out a considerably larger number had it not been for material shortages and strikes. According to the AMA publication, production stoppages at one time or another have been caused by shortages of nearly every type of component used in automobiles, with the exception of tires, since the end of the war. Strikes have also been costly in lost production, and it is estimated that automobile industry employees since the end of the war have lost \$500 million in wages caused by strikes or layoffs resulting from strikes in other plants. In addition, there have been more than 1000 production stoppages or curtailments because of supply shortages from other industries.

In spite of the many difficulties, the industry this year has turned out more than 3.8 million vehicles in the United States alone, or nine per cent more than for the same period of 1947. If the rate continues for the remainder of the year, the industry should turn out more than 5.2 million vehicles this year, which would be the second largest production year on record, exceeded only by 1929. During the postwar period the fourth quarter has been a high production period, and it is expected that it will hold true again this year.

Dodge Oil-Cylinder Coating Eliminates Breaking-In

A protective oil-absorbing chemical coating applied to the cylinder walls of



ANNOUNCED BY AUTOCAR

Announced by the Autocar Co., this new cab-over-engine highway tractor, the U-45-T, powered by a six-cyl, 119-hp, Autocar engine, has a GVW of 24,000 lb and a wheelbase of 106 in. The U-45-T is also available in a model with a wheelbase of 96 in.

NEWS of the AUTOMOTIVE INDUSTRIES

Dodge engines in the past year has virtually eliminated the scuffing or scoring piston rings, pistons, or cylinder walls, according to E. C. Quinn, Dodge general sales manager. It is claimed that as a result new Dodge cars may be driven at 40 mph for the initial 250 mi without engine damage, thus reducing the usual breaking-in. In applying the protective coating, it is said that a chemical process creates on the cylinder walls thousands of minute pockets or pores that trap and retain oil, thereby providing better lubrication. Simultaneously, the process applies to the cylinder walls a protective oil-absorbing coating of manganese iron phosphate crystals that become chemically combined with the cylinder walls and which possess properties that tend to prevent the flow of metal under conditions of extreme heat or pressure.

Horton Named President of American Trucking Group

The American Trucking Associations, Inc., elected Herman DeWitt Horton, chairman of the board of the Associated Transport, Inc., New York, as president at the annual meeting recently. Ed J. Buhner, the 1948 president, was named as chairman of the board. Mr. Buhner is also chairman of the board of the Silver Fleet Motor Express, Louisville, Ky. Ted V. Rodgers, formerly chairman of the board, was appointed honorary chairman of the board for life. Other officers elected include the following: first vice president, Henry English, Red Ball Lines, Inc., Dallas, Tex.; second vice president, C. J. Williams, Hillside Garage and Transit Co., Milwaukee, Wisc.; third vice president, D. L. Sutherland, Middle Atlantic Transportation Co., New Britain, Conn.; fourth vice president, Fred B. Hufnagel, Jr., Sun Oil Co., Philadelphia, Pa.; treasurer, Charles P. Clark, the Columbia Terminals Co., St. Louis, Mo.; and secretary, Chester C. Moore, chairman of the board, Central Motor Freight Association, Chicago, Ill.

Two New Plants in Pittsburgh for GM's Fisher Body

J. J. Cronin, GM vice president, and general manager of the Fisher Body Div., has disclosed that Fisher will establish two new plants in the Pittsburgh area. A war surplus plant in Ambridge, Pa., with 242,000 sq ft of space, is being leased by Fisher for blanking operations, and a new plant to be built on a 65-acre site will have 600,000 sq ft for stamping operations. Operations at the

leased plant are expected to start in 60 days. Construction of the new plant is expected to be completed next year.

Award Henry Ford II for Human Relations

Henry Ford II has been awarded the Human Relations Medal by the Society for the Advancement of Management at the Society's annual meeting in New York City on Oct. 28. This award is made annually to the businessman whose company does an outstanding job in the field of employee and industrial relations. Mr. Ford was honored for

Dynaflow to be Standard on '49 Buick Roadmasters

Buick will include the Dynaflow transmission as standard equipment on all 1949 Roadmaster series 70 models scheduled for introduction late this month. At the same time, the Dynaflow will be offered as optional equipment on the Super 50 series. It is said to be a new unit specifically designed to the characteristics of the engine used in the Super series. Buick has already turned out more than 50,000 Dynaflow transmissions which are currently in use on the Roadmaster series. Produc-

NEW PASSENGER CAR REGISTRATIONS*

Arranged by Makes in Descending Order According to the Eight Months' 1948 Totals.

MAKE	EIGHT MONTHS						
	August 1948	July 1948	August 1947	Units		Per Cent of Total	
				1948	1947	1948	1947
Chevrolet	61,509	51,321	53,459	470,443	429,421	20.65	20.82
Ford	41,589	39,104	42,082	257,091	337,201	11.28	16.35
Plymouth	36,149	31,649	27,284	225,353	206,637	9.89	10.02
Buick	21,804	18,565	19,995	169,996	154,774	7.33	7.50
Pontiac	19,310	16,127	16,242	152,961	136,786	6.71	6.63
Dodge	20,807	19,163	19,720	144,137	134,943	6.33	6.54
Oldsmobile	16,133	13,734	14,285	121,371	119,576	5.33	5.80
Studebaker	11,511	13,231	7,521	97,677	67,221	4.29	3.26
Nash	10,867	9,735	8,201	82,221	70,416	3.61	3.41
Mercury	14,684	13,068	6,881	75,857	66,937	3.46	3.34
Kaiser	11,645	10,665	5,602	79,229	28,352	3.43	1.37
Hudson	7,795	10,497	8,672	77,300	67,768	3.39	3.29
Chrysler	10,532	9,785	8,604	70,795	60,918	3.11	2.95
De Soto	8,192	7,224	6,740	54,505	46,761	2.39	2.27
Packard	7,262	7,380	4,331	52,801	29,341	2.32	1.42
Frazier	3,312	5,407	5,571	45,011	26,690	1.98	1.29
Cadillac	6,088	5,169	4,612	38,644	34,808	1.70	1.69
Crosley	2,747	2,680	1,387	18,908	10,171	.83	.49
Lincoln	2,810	3,987	1,564	18,817	16,056	.83	.78
Willis	645	754	2,025	15,120	15,623	.66	.76
Austin	1,002	1,012	.....	6,515	.....	.29	.....
British Ford	597	337	.....	1,234	.....	.05	.....
Playboy	14	11	.....	47	.....	.....	.....
Tucker	1	.....	.....	2	.....	.....	.....
All Others	783	601	88	3,487	551	.14	.03
Total	317,788	291,206	264,866	2,278,522	2,062,951	100.00	100.00

* Data from R. L. Polk & Co.

his untiring efforts to minimize layoffs during the recent model change-over in his plant, thereby creating a feeling of understanding and cooperation throughout the organization.

Clark to Make and Sell Flader Products

A long-term, joint arrangement in which Clark Bros. Co., Inc., of Olean, N. Y., will manufacture and distribute for general industrial use gas turbines and axial compressors designed by Fredric Flader Inc., Buffalo engineering and research concern, has been announced by the two companies. The agreement contemplates that Flader will be responsible for research, engineering and design and that Clark Bros. will manufacture and distribute these products.

tion has expanded rapidly, and now averages more than 450 units a day.

New Manufacturing Unit for Dearborn Motors

The Dearborn Motors Corp. has established a new manufacturing and engineering division. The new unit will include research and product development, production engineering, master mechanics, quality control, scheduling and methods and cost analysis. Ralph E. Hunt, who joined Dearborn Motors in April of this year and who was formerly production specialist with GM and Nash-Kelvinator, has been named manager of the new division. Research and product development and production engineering had been formerly supervised by C. R. Powers who has resigned to enter his own business.

NEWS of the AUTOMOTIVE INDUSTRIES



HIGH FLYER

Now being flight tested, the U. S. Air Force's two-place liaison helicopter, the XH-15, made by Bell Aircraft Corp., is powered by a Continental 275-hp engine and is said to have a top speed of over 100 mph, a service ceiling of 20,000 ft, and a combat radius of 100 mi.

Parts Volume Accounts for Record Cars in Use

Record replacement parts business, since the end of the war provides the answer to the present all-time high of 32.5 million cars in use in the United States today. According to the AMA, it is estimated that about 14 million cars which are more than 10 years old and which normally would have been scrapped are still in existence far beyond the average time they would have been junked before the war. In addition, two million cars are 15 years or more old. Of the 32.5 million total passenger cars, about eight million have been built since the end of the war, and by the end of this year it is estimated that total postwar cars will number about nine million. The average age of cars has dropped slightly from nine years in 1946 to about 8.7 years. The replacement parts output last year totaled \$2.3 billion wholesale value.

Name McDonald President of NMTBA

At the end of the 47th annual meeting of the National Machine Tool Builders' Association in Atlantic City, N. J. recently, Lloyd D. McDonald, vice-president, The Warner & Swasey Co., Cleveland, took office as president. David Ayr, president, the Hendy Machine Co., Torrington, Conn., was advanced from second vice-president to first vice-president. Richard E. Le Blond, president, the R. K. Le Blond Machine Tool Co., Cincinnati, O. took office as second vice-president. Louis Polk, president, the Sheffield Corp., Dayton, O., was re-elected treasurer. New directors for a three year term include Ralph J. Kraut,

president and general manager, Giddings and Lewis Machine Tool Co., Fond du Lac, Wis., and Alfred V. Bodine, president and treasurer, the Bodine Corp., Bridgeport, Conn. Mrs. Frida F. Selbert was again named secretary. In addition to the officers and new directors, the Board includes Herbert L. Tigges, executive vice-president, Baker Brothers, Inc., Toledo, O.; Milburn A. Hollengreen, president, Landis Tool Co., Waynesboro, Pa.; and Harold B. Smith, president, Illinois Tool Works, Chicago, Ill.

At this meeting, the NMTBA announced that it is considering the admission of press manufacturers to its membership, and that a ballot will be submitted to the members upon which they can vote for or against the admission of press manufacturers to the NMTBA. As a good many press manu-

facturers have long been members of the Association, it is said that this is simply a matter of putting up to the membership the question as to how much farther the Association wants to go in this direction.

AC Spark Plug Adding to Flint Plant

GM's AC Spark Plug Div. is adding a new 150,000 sq ft addition to its spark plug plant in Flint, Mich. The new addition will be used for storage purposes with present manufacturing facilities to be expanded into space currently used for storage.

Borg-Warner May Buy Steel Plant in Warren, O.

The Borg-Warner Corporation is reported to be negotiating for the purchase of the Copperweld Steel Co. plant at Warren, O. The plant is said to be the third largest electric furnace steel plant in the country, and it produces high grade alloy steels. Borg-Warner acquired the Superior Sheet Steel Co. of Canton, O. last year and operates two steel facilities of its own, the Calumet Steel and the Ingersoll Steel divisions.

Automotive Executives Attend Armed Forces Courses

As a first step toward industrial mobilization in any future emergency, the Armed Forces Industrial College is holding a series of 10-day courses in various cities throughout the country attended by key industrial and educa-

1948 MOTOR VEHICLE FACTORY SALES FROM U. S. PLANTS*

	Passenger Cars	Trucks	Buses	Totals	
				1948	1947
First Quarter	929,926	346,860	853	1,280,699	1,142,236
Second Quarter	845,938	358,324	442	1,207,674	1,206,411
Total—Six Months	1,775,864	705,184	1,295	2,488,373	2,348,647
July	356,764	116,780	65	474,556	379,192
August	348,804	111,760	96	461,335	349,409
Total—Eight Months	2,481,432	933,724	1,456	3,424,264	3,077,248

1948 FACTORY SALES TO DOMESTIC AND FOREIGN MARKETS*

	Passenger Cars		Trucks		Buses	
	Domestic	Foreign	Domestic	Foreign	Domestic	Foreign
First Quarter	869,324	60,602	291,354	55,506	3,060	853
Second Quarter	791,529	54,409	310,575	47,749	2,970	442
Total—Six Months	1,660,853	115,011	601,929	103,255	6,030	1,295
July	334,736	22,028	98,249	18,531	947	65
August	328,176	20,628	97,222	14,538	675	96
Total—Eight Months	2,323,765	157,667	797,400	136,324	7,652	1,456

* Automobile Manufacturers Association.

NEWS of the AUTOMOTIVE INDUSTRIES

tional executives and reserve officers. The course was held in Detroit, Oct. 18-25, and was attended by a large number of automotive executives. The training program given is a condensed version of the full 10 months course given at the Armed Forces Industrial College to key military personnel. Lectures include the following subjects: resources, requirements, procurements, contributing factors, manpower, production, technological progress, economic potential, and economic mobilization planning. In order to accommodate business executives, the courses are given in two sessions each day from 10 to 12 and 1 to 3 allowing the executives to spend time in their offices at the beginning and close of the business day.

Appoint Ostrander Manager Of Lincoln-Mercury

Stanley Ostrander, who has been general manager of the Ford Highland Park plant since early this year, has been appointed manager of operations of the Lincoln-Mercury Div. T. W. Skinner, who had been general manager of the division since it was formed three years ago, has resigned to enter private business. It is expected that Benson Ford, director of the L-M Div. and a Ford vice-president, will assume the post of general manager. Mr. Ostrander was formerly general manufacturing manager of GM's Pontiac Motor Div. He took over his new duties Nov. 1. He will be succeeded at the Highland Park plant by Alton J. Hole, formerly his assistant.

Use of Isotopes Requires Health Precautions

Increasing use of radioactive isotopes for industrial research is accompanied by health hazards to personnel requiring complete medical examinations at regular intervals, according to Dr. Rex H. Wilson, medical director for The



British Combine

EXPERIMENTAL START

Shown being experimentally started, the Marquardt M-14 Whirlajet, powered by two pulsejet engines and said to be the first known pulsejet-powered helicopter, will be equipped with a built-in starting system consisting of an air compressor and tank in the fuselage in production models. Here a jet of air, supplied from a compressor, is shown being manually directed into the engines.

B. F. Goodrich Co. He said that detection of exposure to ionizing radiation is very difficult since there is no pain or other sensation involved. White blood cells, he added, are damaged by a slight amount of radiation, while the nervous system can apparently withstand large amounts. Dr. Wilson recommends the use of detection devices for exposed personnel such as a small pocket ionization chamber in the shape of a fountain pen which sounds an alarm at a predetermined level, usually .01 roentgen. Another device is a badge consisting of a radiosensitive film which can be shown and developed at the end of each day or week to show the amount of radiation to which the person has been exposed.

Westinghouse Sponsors Second Mat'l's Handling Conference

Sponsored by the Westinghouse Electric Corp., the second Materials Handling Conference will be held Nov. 8-9 in Buffalo, N. Y. E. L. Bailey, Chrysler Corp., will open the program with "A User's Eye View of the Materials Handling Industry."

Allison May Hike Jet Output

The present U. S. Air Force contract with GM's Allison Div. at Indianapolis, calling for a production of 3095 jet engines in the present fiscal year, will be maintained at this rate, or higher, during fiscal year 1950, it was recently revealed.

Improved Group Insurance for Ford Salaried Employees

The Ford Motor Co. will put into effect on Dec. 1 an improved group insurance plan for salaried employees. Under the new plan, which covers approximately 25,000 salaried employees, life insurance benefits will be more in proportion to individual salaries. Sickness and accident benefits have been liberalized, and a new feature of the plan is accidental death and dismemberment coverage.

B-W Int'l to Handle Muncie Export

The Borg-Warner International Corp. will handle the export activities of the Warner Machine Products, Inc., Muncie, Ind., according to a recent joint announcement.

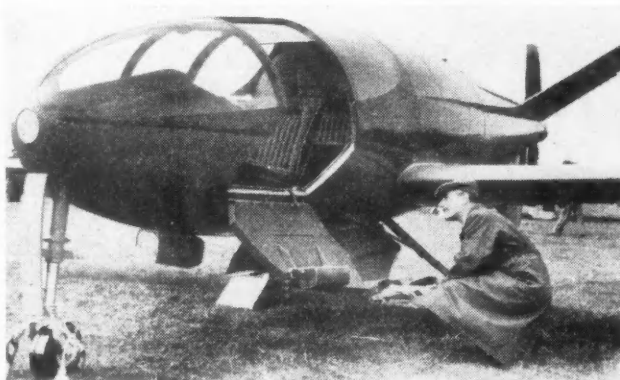
No NLRB Election For Tucker Employees

Because production of the Tucker automobile is still in the experimental stage, the NLRB has refused to conduct a bargaining election among Tucker Corp. workers. The board said that presently there are only 190 employees at the Tucker plant, compared with a previous estimate that nearly 2200 would be working at this time and more than 9300 by next April.

(Turn to page 60, please)

PUSHING PLANET

Exhibited recently at the Society of British Aircraft Constructors show at Farnborough, England, the all-metal Planet Satellite, powered by a Gipsy Queen 31 engine, features a propeller located in the tail.



Acme

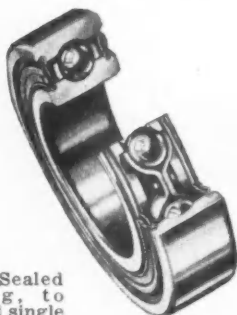
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Worker Output under Socialism in England

SO MANY official appeals have been made to British workers to increase individual output that there can be little doubt of the lack of effort. Sir Stafford Cripps has declared "the only way in which we can attain the absolutely vital increase in our production is from a higher rate of output per man per year." Mr. Morrison, addressing the labor unions, used practically the same words and appealed to the worker not to exploit his immediate tactical advantage against the needs of the community.

Recently a strike was declared at the Austin works because of the refusal of the workers to maintain the output shown possible by the demonstrator of American gear cutting machinery. If there are innumerable complaints against the limited output of the individual worker, there seems to be a reluctance on the part of manufacturers to admit that there are any restrictive practices. One important British firm, having close connections with the United States, said that the labor situation was perfect, and if the individual Britisher was not producing as much as the American, it was because he was less highly mechanized. This seems to be another way of saying that the factory was at fault and not the workers in the factory. As this particular firm claims to have the best equipment in the country, the admission is rather strange.

There are no indications that labor is showing any real opposition to the introduction of higher output and cost reduction machinery. Nor has labor, on the whole, made use of its representatives on Management Advisory Committees to block improved methods. The tempo, however, is slow, not only in comparison with America but in comparison with the individual output in some other European countries. The Britisher appears to dislike having to admit this—at any rate publicly.

C. Calcott Reilly, managing director of Jowett Cars Limited, is more outspoken, although he probably only reflects the secret opinion of the majority of manufacturers when he says "the British worker is not con-

London

sciously limiting output, but the matter is actually a psychological one, going back to the economic education of generations."

After pointing out that in the United States everyone realizes that the standard of living depends on production, Mr. Calcott Reilly touches the crux of the matter when he states "In Britain, owing to the periods of unemployment, the basic economic creed is that as far as possible work should be distributed among the greatest number of men and that a man who works too fast is robbing his fellow workmen of a job. This has been taught by the Unions and the Socialists for years and is so ingrained in the minds of the workers that now conditions are different they cannot change their attitude. The result is that the tempo of all

types of work is definitely slow.

The tempo of work is a matter of habit and a fast tempo can only be taught gradually.

"Unfortunately it is often only fear of lack or loss of a job that forces an increased tempo. It must be realized that present food rations are not adequate for

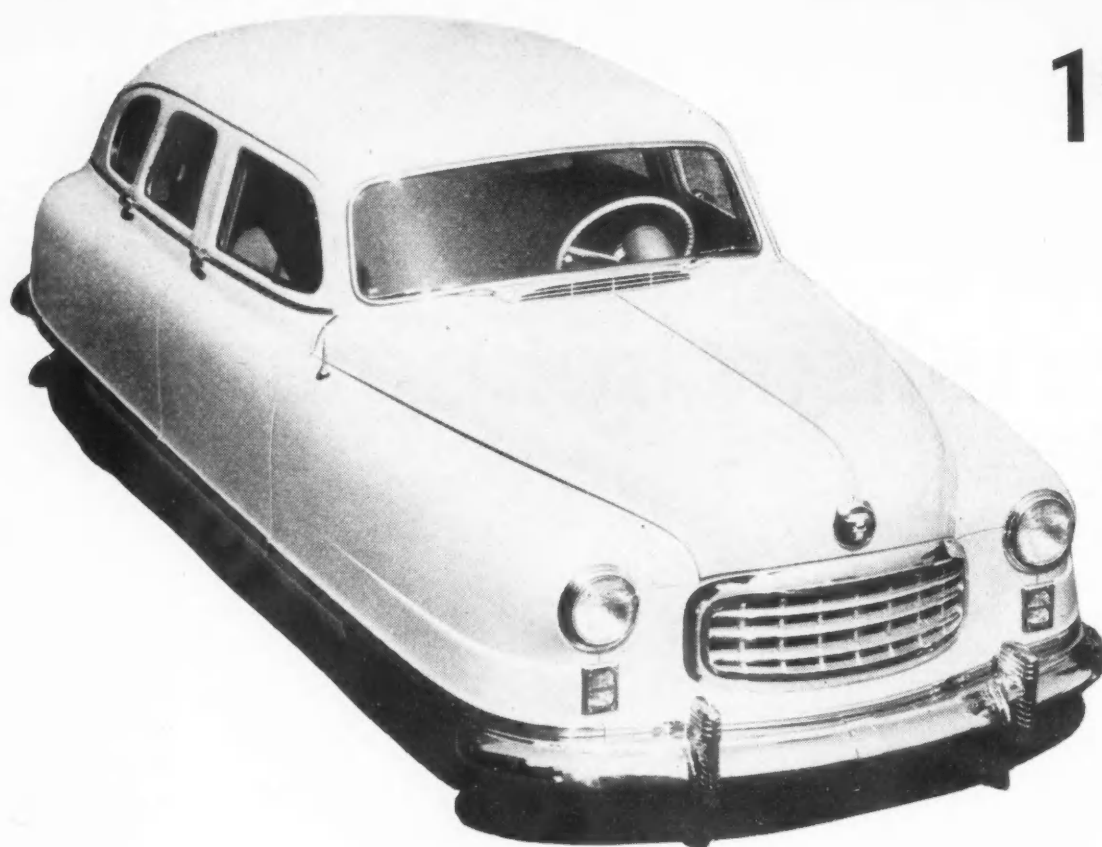
really hard work; also that the British worker put in a tremendous job during the war. After that he was tired, dispirited, underfed, and the tempo of work slowed down. This situation is gradually improving, but in my opinion it is still only half the speed of the ordinary factory worker in U. S. Of course in the United States practically all mechanical work is conveyorized and the machine drives the men. But even with hand work I found that the tempo in America was very much faster than in this country.

"In the automobile industry in the United States wages are the equivalent of 8 shillings 6 pence per hour. In this country they are less than 3 shillings, but the cost of the product in the United States is in many cases only half the cost of the same product in this country. This is partly due to the enormous numbers involved and therefore the very elaborate tooling, but I am sure that it can also be attributed to the fact that the American is ready to work machines at twice the speed that they work in this country."

By W. F. Bradley

Special European Correspondent for
AUTOMOTIVE INDUSTRIES

1949



This view shows the Airflyte styling of the 1949 Ambassador and "600" models.

THE Nash "600" and Ambassador lines, completely restyled for 1949 and offering important mechanical changes and improvements, have been announced by Nash-Kelvinator Corp. The two lines have advanced styling executed in unitized bodies—termed Airflyte—said to be first postwar models with front wheels totally enclosed. Wheel removal is effected without difficulty, according to the company.

Generally speaking, the 1949 models have the following major features, to be described more in detail later:

Bodies—Lower, longer, wider, of unitized construction on both models, and rear doors hinged at the front for safety.

Suspension—Both models have independent coil spring suspension at the front and coil springs at the rear, eliminating rear leaf springs on the Ambassador.

Drive—Torque tube drive, formerly used only on the "600," has been extended to the Ambassador. Both models have a center propeller shaft bearing built into the torque tube.

Engines—Crankshafts redesigned for both models to improve smoothness. Exhaust manifold changed on both models. Improved carburetors on both models for better per-

formance and a greater economy of fuel.

Performance—Better riding quality, greater safety and still better fuel economy are stressed in these models. At the same time it is claimed that accessibility for service operations has been improved.

Nominal wheelbase remains the same as before—112 and 121 in., respectively—the overall length being increased less than an inch. On the other hand, the front tread has been narrowed to 54 11/16 in. on both



Completely new body styling is apparent in this rear view of one of the 1949 models.

Nash Models

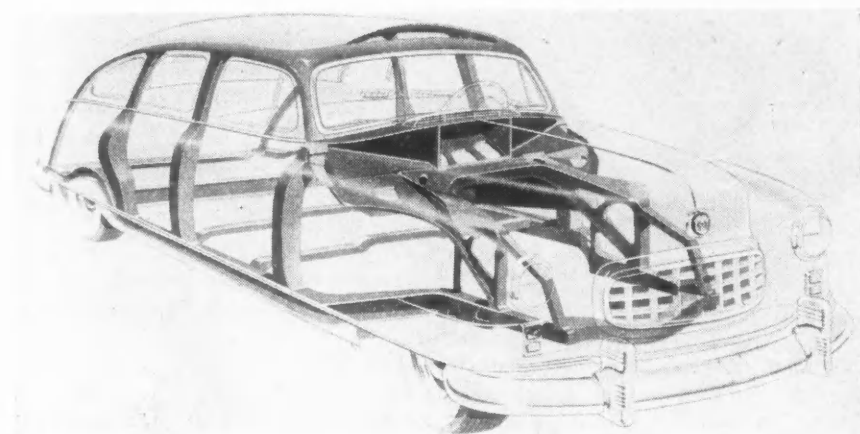
Feature New Bodies and Airflyte Styling

Other Improvements Include Important Engine Changes, Uniscope Instrument Cluster Mounted on Steering Column Jacket, Torque Tube Drive and Rear Coil Springs on Ambassador, and More Effective Weather-Eye Conditioned-Air System.

models to permit full swing of front wheels on turns. Front seat width is about 6 in. wider, the rear seat about 1 in. wider. The floor is about 2½ in. lower while the roof is about 6 in. lower.

A distinctive interior feature is the clean up of the instrument panel by grouping all instruments in a single housing, shrouded for shielding from glare. This instrument housing—called the Uniscope—is mounted on the steering column jacket just forward of the steering wheel.

The steering column jacket is 4 in. in diameter and encloses the steering column, gear shift linkage, speedometer cable and wiring to the Uniscope and light switches, and to the direction signal, the latter being an optional accessory. By extensive use of noise-insulating rubber the column jacket is said to be free from drumming and noise.



Redesigned frame construction at the front end provides for improved mounting of the front suspension system.

Comparative Dimensions of 1949 and 1948 Nash Models

	1949		1948	
	"600"	Amb.	"600"	Amb.
Series Identification	4940	4960	4840	4860
EXTERIOR				
Wheelbase, in.	112	121	112	121
Overall length, in.	201	210	199 ⁹ / ₁₆	208 ⁹ / ₁₆
Maximum width, in.	77½	77½	74½	75¾
Height-empty, in.	62	63	68¼	69¼
Tread, front, in.	54 ¹ / ₁₆	54 ¹ / ₁₆	57½	57½
Tread, rear, in.	59 ¹ / ₁₆	60½	59 ¹ / ₁₆	60½
BODY				
Front seat elbow width, in.		63		57
Rear seat elbow width, in.		61		60
Front seat leg room, in.		41 to 36½		41 to 37
Rear seat leg room, in.		40 to 44½		39 to 44
Interior height, front seat, in.		36		36
Interior height, rear seat, in.		34½		36

The Uniscope, a feature of 1949 Nash cars, is mounted at the top of the large steering column jacket and contains all the instruments commonly located on the instrument panel, as shown by the inset.

producing tendencies. Incidentally, the direction signal may be readily installed either at the factory or in the field.

Although engines for both models remain unchanged so far as major mechanical specifications are concerned, they both feature many important changes conducive to improved performance and still better fuel economy. On the "600" the crankshaft is 80 per cent counterweighted—compared with 63 per cent last year—the shaft being redesigned for greater stiffness. Diameter of crankpins is upped $7/32$ in., from $1\frac{1}{8}$ to $23/32$ in. Since a larger bearing area is not considered necessary, it was possible to decrease bearing width and thus permit thicker cheeks between bearings, this resulting in a 25 per cent increase in shaft stiffness.

The Ambassador crankshaft remains 100 per cent counterweighted and with seven main bearings. However, counterweighting is better distributed on the 1949 model by the use of eight counterweights instead of the four used previously.

Reduction in the number of camshaft bearings from six to four on the Ambassador is claimed to reduce



falling off of oil pressure at idling speeds.

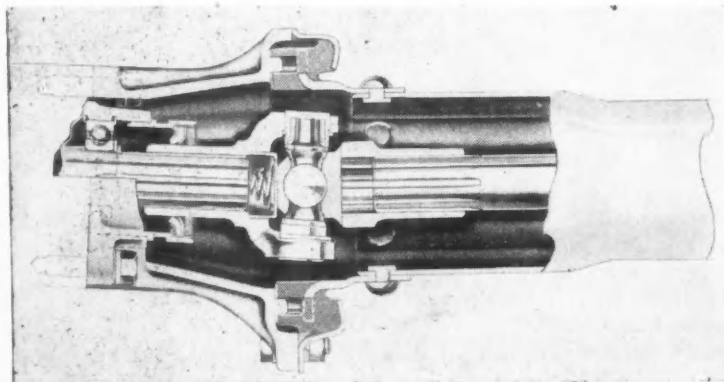
Pistons in the "600" now are fitted with four rings—same as in the Ambassador—instead of the three ring set-up used previously, rods being $\frac{1}{4}$ in. shorter to provide for the lower position of the piston pin in the piston. Piston pins on the "600" are clamped in the rods and the rifle drilling of rods has been eliminated, although it is continued

on the Ambassador.

A newly-developed water pump with a cartridge-type packless seal is standard on both models. The seal is enclosed in a metal cartridge which is mounted and sealed in the pump body by means of a flexible, doughnut-shaped rubber ring.

Instead of the conventional type thermostat used heretofore, Nash has adopted a thermostat operated by an element consisting of a capsule filled with a special heat sensitive powder which expands on heating.

By making some major changes in the carburetors for both engines, it is claimed that fuel economy is improved from $1\frac{1}{2}$ to $2\frac{1}{2}$ mpg up to 50 mph. Developed by Nash engineers, the carburetors are said to be simpler



The torque tube is assembled to the rear of the transmission housing by a rubber mounting which provides flexibility, absorbs vibration, and seals the universal joint against dirt and water.

by the elimination of a separate jet, plug and vent. The accelerating pump is arranged to discharge into passages between the main jet and the high speed nozzle.

Accelerator pedal pressure has been reduced by a revised geometry of the hook-up. At the same time pedal travel at small throttle openings has been increased to reduce sensitivity.

Some important changes have been made in the exhaust piping of the two models. On the Ambassador the pipe is run around the front of the engine to avoid overheating of accessories on the left side of the engine. On the "600" the piping is shortened by eliminating the reverse bend and leading to the muffler directly from the rear end of the section clamped to the block, rather than from the front end. At the same time the fuel line on the "600" has been moved to the left side away from exhaust pipe and muffler to reduce

vapor-locking tendency. The fuel line in the Ambassador also has been relocated to the side opposite the exhaust system, crossing over to the fuel pump at the front cross member.

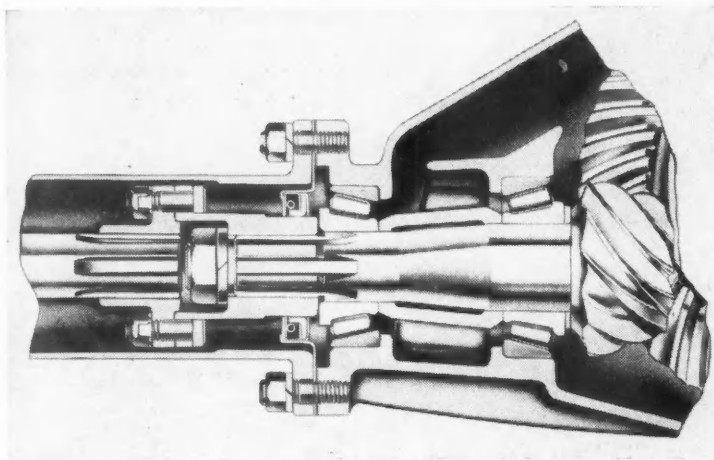
Mufflers are of the same general design as before but have less back pressure and are of oval shape. A heat deflector has been added above the muffler to prevent transfer of heat to the body floor. Mufflers are supported by two fabric straps and two rubber insulators.

The battery, of side-by-side cell type, is moved from under the front seat to the engine compartment on the left side near the starting motor.

Following the pattern of engine mount design on the 1948 Ambassador, four mounts are used on each engine with box-type rear mounts fitted on the rear engine mounting cross member. Although this cross member is interchangeable on both models, the mounts differ in size. The rear mounts aid in absorbing both wheel thrust and vertical loads. Front mounts are located on the front suspension member and are independent of the body structure. It is of interest to find that despite the unitized design of the body and front cross-member location it is still possible to drop the oil pan without removing the engine.

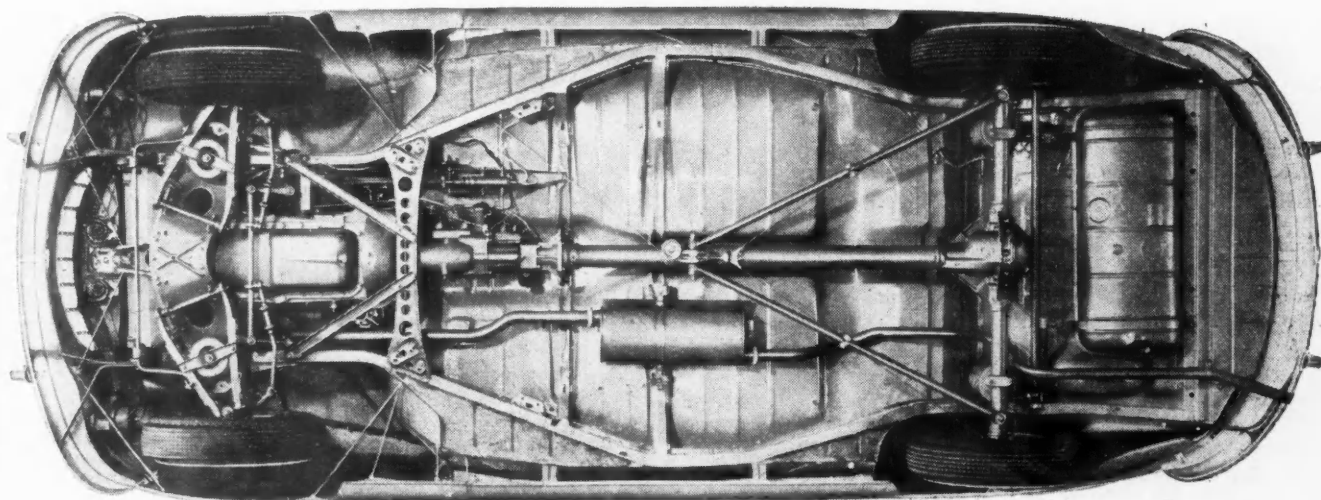
Torque tube drive and coil spring suspension at the rear are standard features on both models, taking the Ambassador out of the Hotchkiss drive category. Although the front end construction of the torque tube on the "600" remains the same as before, it was necessary to develop an attachment of greater capacity at this end for the Ambassador. Rubber is used extensively at this point on the Ambassador and the universal joint is fully sealed. Rubber also is used at the junction of the truss rods with the torque tube. Both models are fitted with a rubber-mounted ball bearing midway of the propeller shaft, replacing the previous plain bearing. It is sealed and lubricated for life and needs no attention.

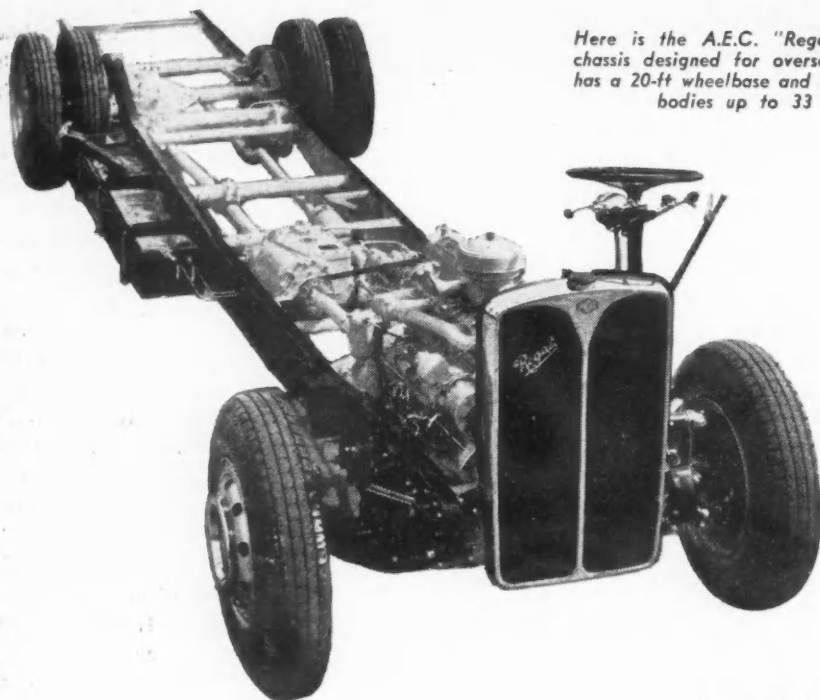
(Turn to page 62, please)



(Above) A new flanged type coupling is used to connect the propeller shaft to the rear axle pinion shaft.

(Below) Underside view of 1949 Nash Ambassador. Note the new rear suspension, torque tube drive, and frame-floor unitized construction.





Here is the A.E.C. "Regal" Mark III bus chassis designed for overseas operation. It has a 20-ft wheelbase and will accommodate bodies up to 33 ft long.

By W. F. Bradley

Special European Correspondent for
AUTOMOTIVE INDUSTRIES

the engine. Being flange mounted, it delivers air directly to the air chamber and ports in the cylinder barrels. The fan is driven off the end of the camshaft. The blower driving-pinion is coupled to its shaft through a spring loaded clutch. Immediately above the blower is a C.A.V. pump with a hydraulic governor driven through a Simms coupling. The injectors are single-hole

spray with direct injection into the combustion chamber. Pistons are cast iron with a shallow cavity head, having one fire ring, two compression rings and two oil rings. Piston pins are nitrided steel with end pads. The crankshaft is carried in seven main bearings, crankpin diameter being $2\frac{5}{8}$ in. and journal diameter

OUTSTANDING among the 450 trucks, tractors, and buses exhibited here in October at the Commercial Motor Transport Show, the first automobile show in England since 1937, was the new six-cylinder, two-stroke, supercharged lightweight Diesel engine introduced by the Foden Co. Originally making use of proprietary engines on its trucks, Foden started work on this design about six years ago to meet the demand for greater power or for the same power in lighter units.

London

A single aluminum alloy casting forms the cylinder block and crankcase, with centrifugally cast wet cylinder liners pressed into the block. The oil pan is made of light alloy with a corrugated oil sump. Magnesium is used for some of the housings.

Bore and stroke are 3.35 in. and 4.73 in. giving a piston displacement of 250 cu. in. The engine develops 126 hp at 2000 rpm and its weight, without electrical equipment, is 1100 lb. This ratio of 8.75 lb per hp is claimed to be lower than that of any other Diesel engine now in production.

The cylinder head is an iron casting in two parts and carries two vertical exhaust valves per cylinder. The valves are operated by rocker arms and pushrods, with a roller-type lifter, from a gear-driven camshaft located in a tunnel in the cylinder block. Accessory drives are by helical gears at the rear of the engine. The Roots blower, running at twice engine speed, has an average boost pressure of five psi and is mounted on the left side of

New Diesel England's



Guy six-cylinder Diesel. Note the location of the oil filter and cooler at the front end of the engine.

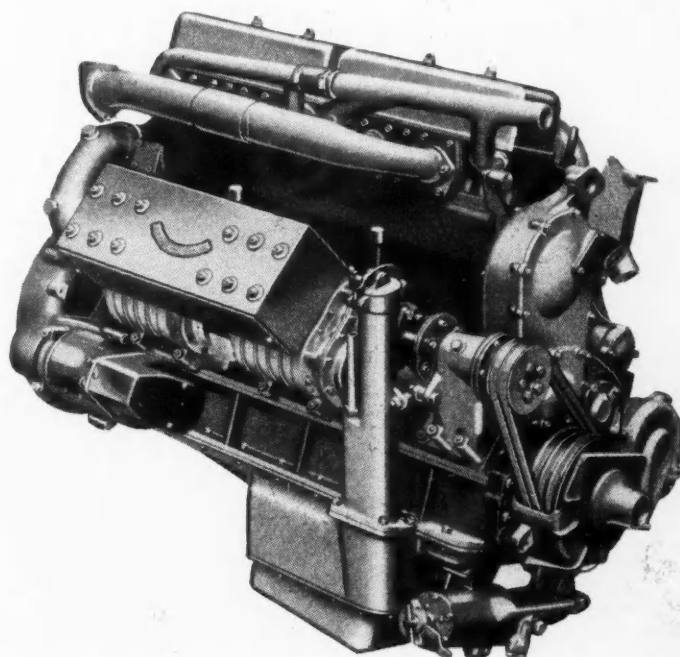


General view of British 1948 Commercial Motor Transport Show.

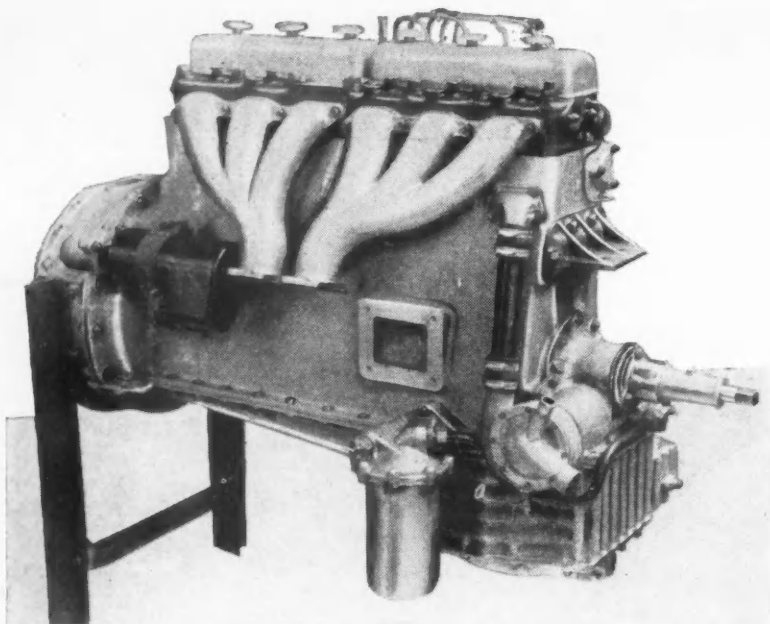
Engines Highlight First Show Since 1937

3 in. It has steel-backed white metal bearings. An unusual feature is the use of aluminum alloy for the exhaust manifolds. These consist of two sets of three pipes, uniting some distance down; further along the line the two are united into one. It is claimed that the unusually cool exhaust enables this metal to be used.

Cylinder head bolts pass right through the aluminum casting to the main bearing caps. While the accessory drives are located at the rear with a view to rigidity and reduced noise, there is a cross shaft at the front, with a water pump on its right extremity and the oil pump at the opposite end. The water pump, which is coupled to its shaft by a spring-



Crossley 524 cu in. supercharged Diesel engine. Its dual Roots supercharger develops from 2.2 to about eight psi.

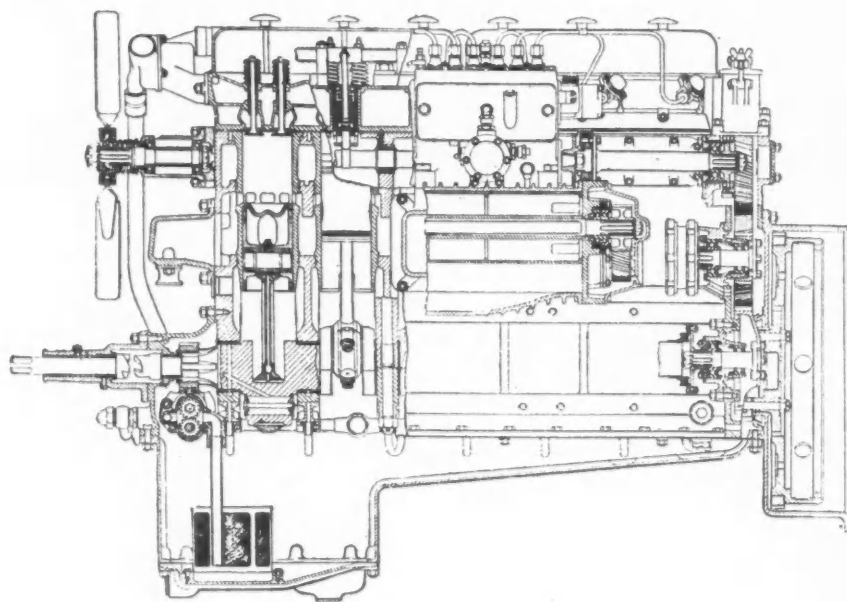


(Left) Right side of the Foden engine showing the light alloy exhaust manifolds.

(Right) Left side of the Foden two-stroke Diesel engine. The fuel injection pump is bolted directly to the supercharger case.

(Below) Here is a part-sectional view of the Fodens high-speed Diesel engine. Note the length, and shape of the piston and location of the piston pin. This illustration is reproduced by courtesy of The Commercial Motor (London).

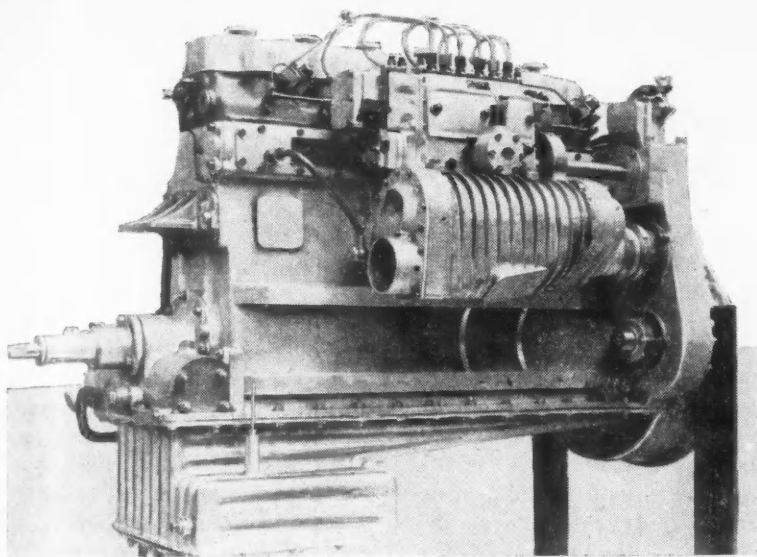
loaded clutch, as a precaution against damage by freezing, carries water up to the water chest at the top of the cylinders, from which it passes into the head, and is injected around the valve seats and guides. The water circulates at high velocity. There is a thermostat and return pipe to the pump for rapid warming up. The corrugated oil sump has the advantage of assisting cooling without any tendency to collect mud. The clutch housing carries two bronze brackets with rubber pads for attachment and on the front of the cylinder casting there is a single bracket with a rubber pad for the third point attachment. The engine is dis-



tinctive by reason of its remarkably clean cut design. Although exhibited at the show in a four-axle truck chassis and a bus chassis, it is designed to be applied also to any of the firm's truck or passenger chassis.

Crossley has a supercharged 524 cu. in. Diesel engine, development of which dates back to the war period and which is now in regular production for high-speed coach service. The design is based on the firm's original unsupercharged model of 4½ by 5½ in.

This new Renault station wagon was displayed for the first time at the Commercial Motor Transport Show in London. The chassis was made in Paris and the body in England. It has a four-cylinder engine and front drive (Acme photo).



bore and stroke, the compression ratio of which has been lowered to 14 to 1. The dual Roots blower is mounted on the right side of the engine and is driven by belts from a pulley on the crankshaft at 1.7 times engine speed. The boost pressure ranges from 2.2 to about eight psi. While the standard Crossley engine develops 100 hp at 1800 rpm, the maximum horsepower obtained from the supercharged version is 150 at 1750 rpm, with a maximum bmep of 135 psi. With supercharging, injection begins earlier and is at a slower rate, and is held over a more extended period. It has been found that the nozzle life is appreciably longer than on the unsupercharged engine. Among the problems which have had to be overcome, according to W. H. Worrall, the engineer in charge of this job, were the automatic metering of the fuel in relation to variations in boost charge, some vibrations set up by the blower impulses, and the life of the driving belts. In certain European countries coach drivers found it possible to get up to 80 mph under favorable road conditions, and it was necessary to produce belts which would stand up to this work and a governor which could not be tampered with. This 50 per cent increase in power has been obtained with a minimum fuel consumption of 0.433 pt (U.S.) per bhp-hr at 1000 rpm. Main features of the Crossley are monobloc alloy cast iron cylinders with centrifugally cast iron liners; cylinder heads in two groups of three; valves of silicon steel, with shrouded inlets to produce swirl; aluminum alloy crankcase with seven main bearings; and roller chain for camshaft and accessory drive.

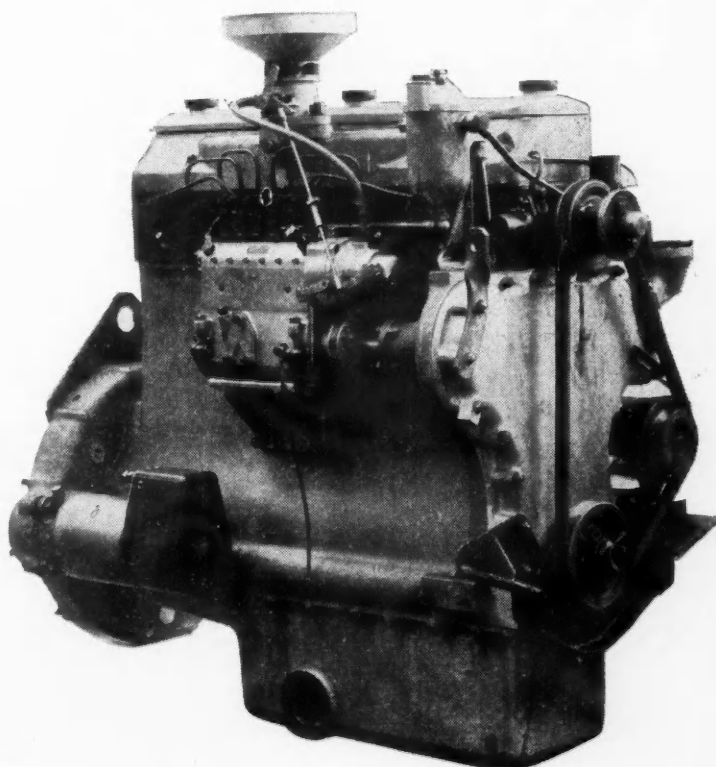
Morris has come on the market with an

This Morris six-cylinder Diesel engine has a cylinder block and crankcase of heat-treated aluminum alloy. The oil pan, flywheel housing, timing gear case and valve cover are light alloy castings.

entirely new six-cylinder 75 hp Diesel of 258 cu in. piston displacement built under license from the Swiss Saurer Co. The cylinder and crankcase assembly is a heat-treated aluminum alloy casting, with detachable, centrifugally-cast iron liners. The bore is 3.34 in. and the stroke 4.92 in. The oil pan, flywheel housing, timing gear case and overhead valve cover are all light alloy castings. A single-piece, chromium alloy iron head is used with two vertical valves per cylinder operated from a "high" chain-driven camshaft. A clear exterior is obtained by the "buried" intake manifold on the right side of the engine and to this accessibility is added by the high mounting of the CAV injector pump. Four-point mounting on rubber blocks is provided. This engine is used on both a truck and a coach chassis.

Thornycroft had six-cylinder gasoline injection type engine on display (see Oct. 1, 1947 AI, page 38), but according to information received, it is not at present in production. With a bore and stroke of $4\frac{1}{8}$ by 6 in., the output as an oil engine is 100 hp at a governed speed of 1800 rpm, while with gasoline injection the output rises to 150 hp at 1900 rpm with a compression ratio of 6.92. Maximum torque is 445 lb-ft and bmep 140 psi at 800 rpm. The engine has a water-jacketed exhaust manifold, intended not only to cool this unit but to maintain an even temperature in the head.

The use of Diesels has extended at both ends of the scale, engines of greater capacity being used and
(Turn to page 72, please)



Overhead Valve V-Eight

THE most striking feature of the Cadillac line—the first General Motors Division announcement for 1949—is the adoption of the high economy, high compression, high speed valve-in-head engine which has stirred discussion in the industry for many years. Stemming from Cadillac research and experimental testing for more than ten years, the new engine is an advanced type 90 deg V-8 of valve-in-head design with a simplified system of hydraulic valve lifters. Not only is this engine a product of Cadillac

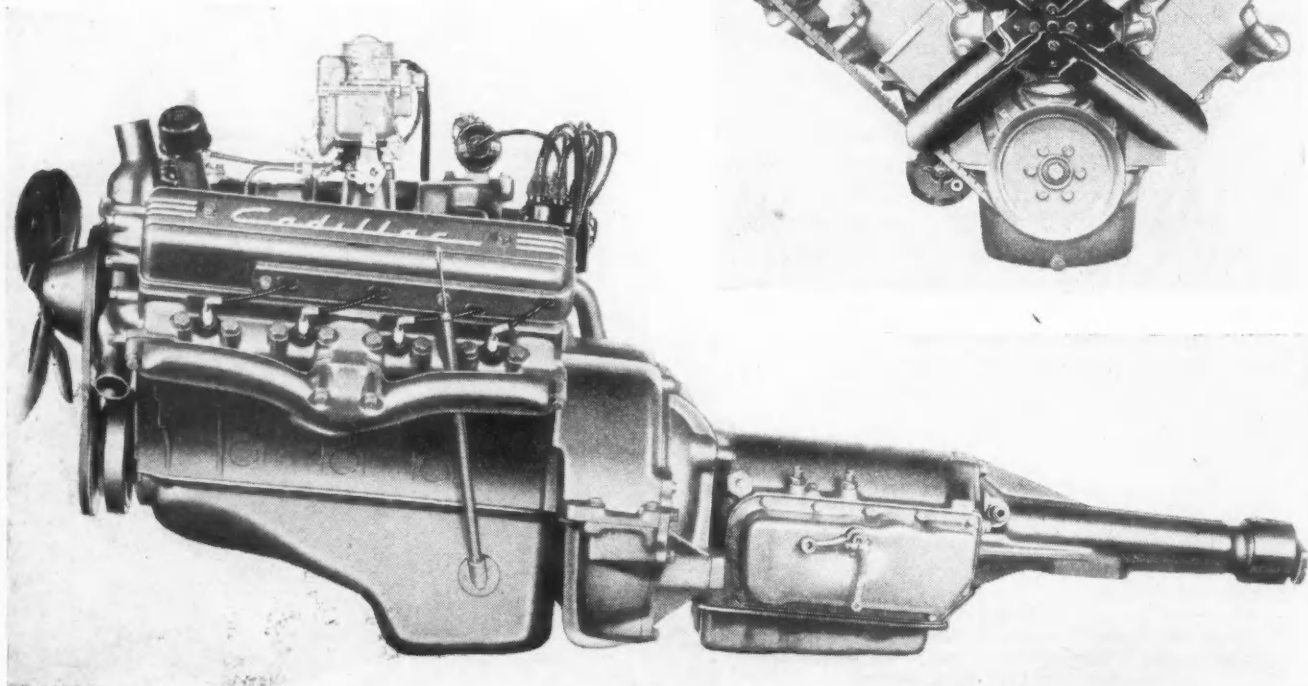
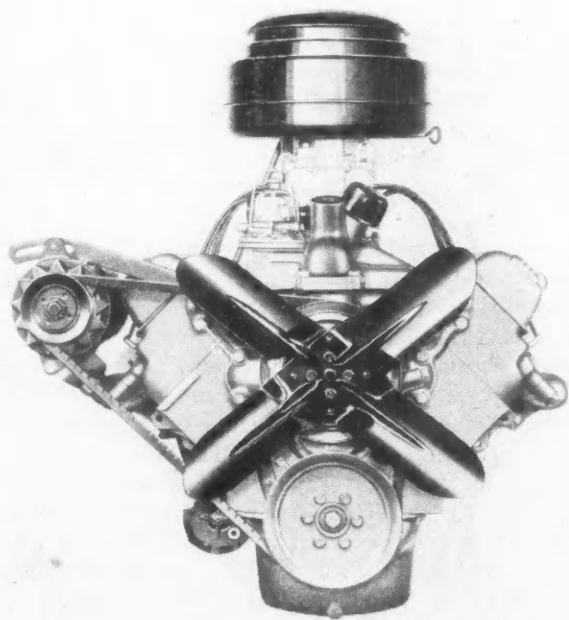
in every respect but prototypes of the current production engine have had more than one million miles of actual service before being released for manufacturing.

With a compression ratio of 7.50 to 1 and a displacement of 331 cu in., the engine develops 160 hp and is said to yield an increase in fuel economy of 15 to 20 per cent over previous Cadillac models under most driving conditions. The 1948 engine had a compression ratio of 7.25 to 1, piston displacement of 346 cu in., and an output of 150 hp.

From the standpoint of performance the new car is said to accelerate from a stop to 80 mph in 30 seconds with full throttle on a level straight-away. Contrary to conventional experience fuel economy gain increases at higher road speeds, the gain being higher at 80 mph

(Right) Front view of 1949 Cadillac engine showing location of some major accessories. The generator is at the extreme left in the illustration; the fuel pump is at the top front; and the breather is in front. Note too the simplicity of the single, wedge-type belt drive.

(Below) Side view of 1949 Cadillac powerplant emphasizing accessibility of all major accessories—carburetor, fuel pump, distributor, etc. The ignition coil is on top directly forward of the distributor. The integral water manifold which dispenses with most of the radiator hose connections may be seen directly back of the fan pulley. The upper flywheel housing is now integral with the crankcase, only the lower half being separable. The starter is attached to the lower half.

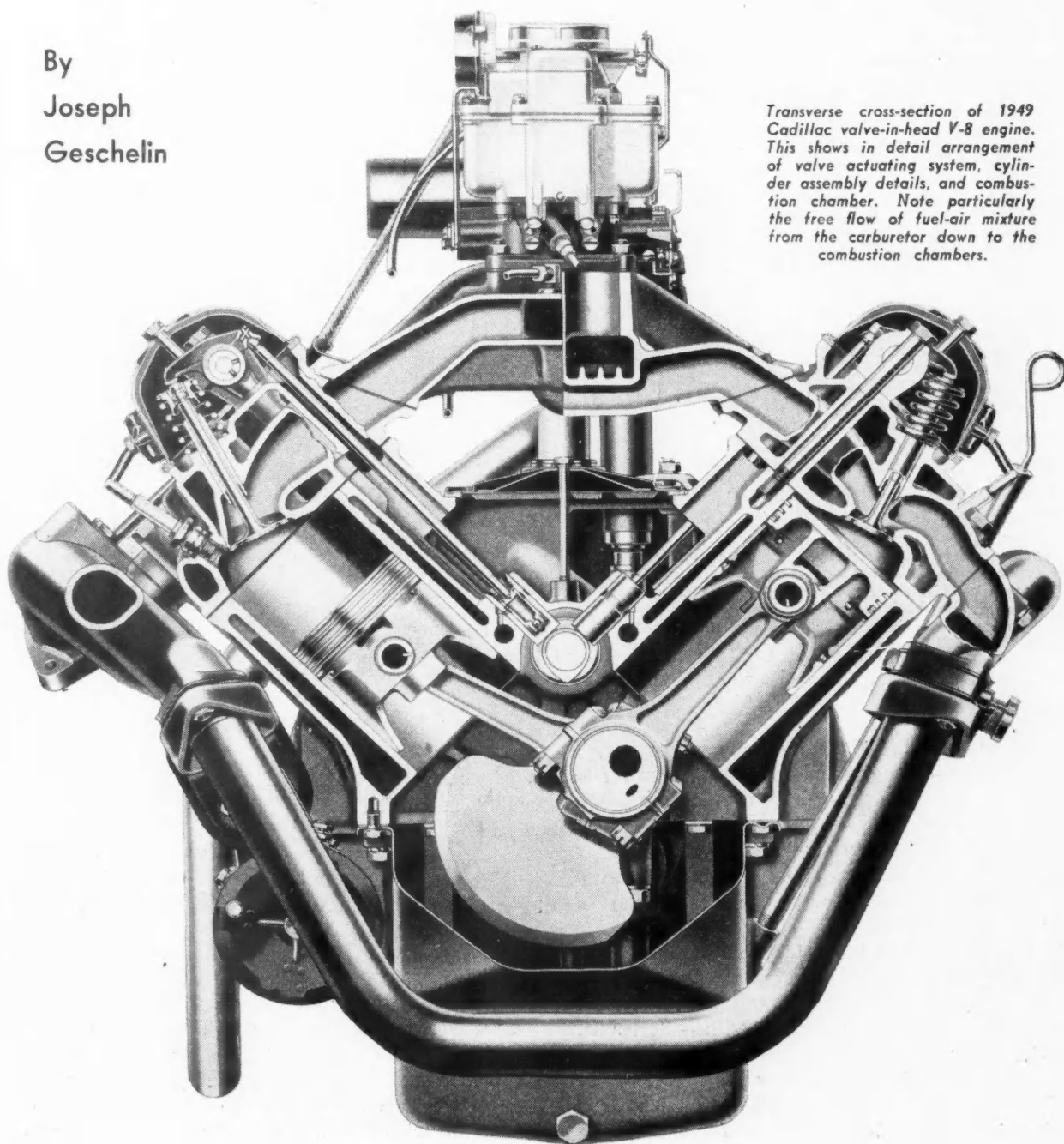


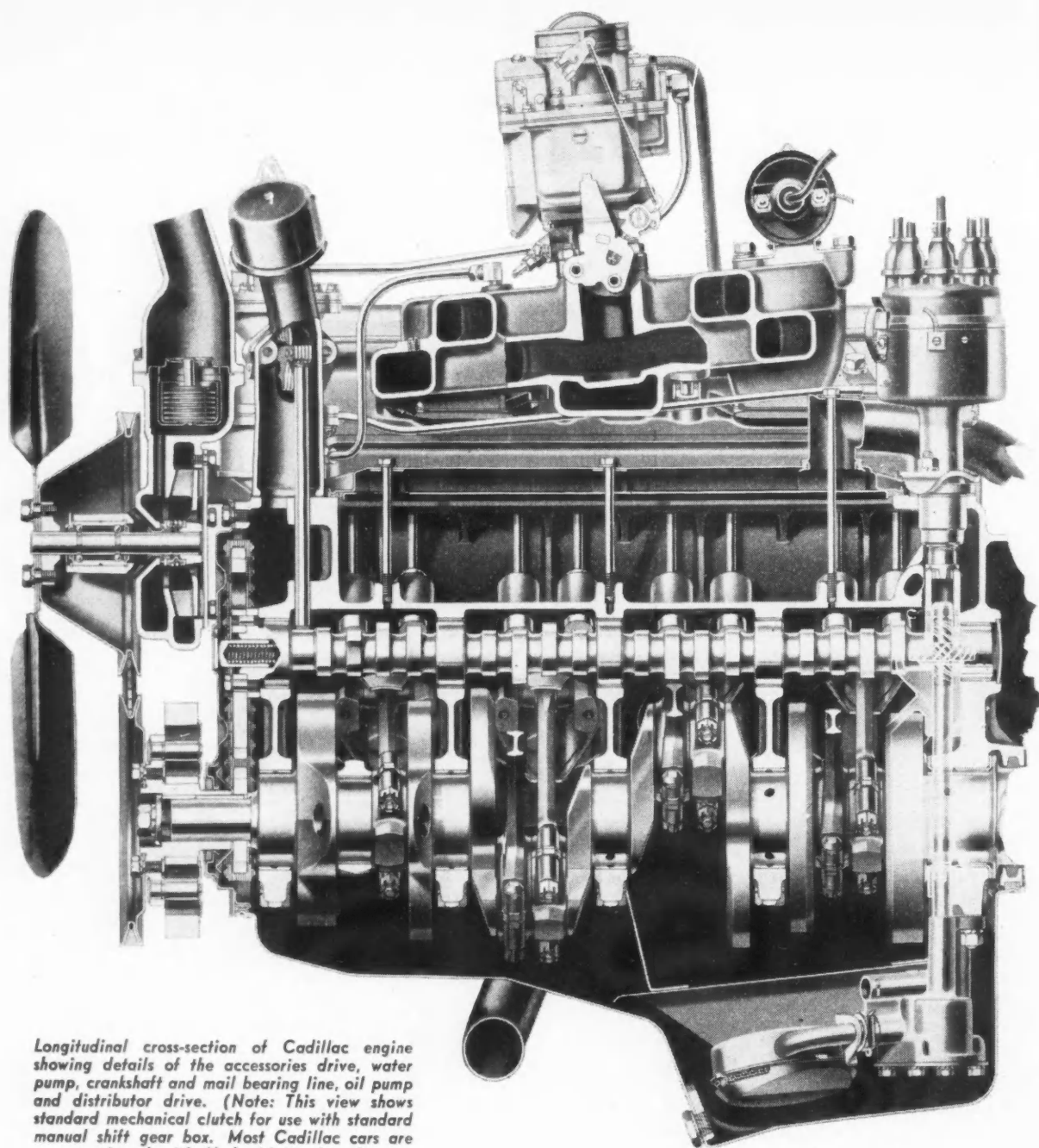
t Powers 1949 Cadillac

Radical Change in Design, Stemming from Development Started in 1937, Results in Smaller, Lighter Engine of Increased Horsepower and Greater Fuel Economy. Improved Hydra-Matic Transmission Continued as Option.

By
Joseph
Geschelin

Transverse cross-section of 1949 Cadillac valve-in-head V-8 engine. This shows in detail arrangement of valve actuating system, cylinder assembly details, and combustion chamber. Note particularly the free flow of fuel-air mixture from the carburetor down to the combustion chambers.





Longitudinal cross-section of Cadillac engine showing details of the accessories drive, water pump, crankshaft and main bearing line, oil pump and distributor drive. (Note: This view shows standard mechanical clutch for use with standard manual shift gear box. Most Cadillac cars are equipped with Hydra-Matic drive.)

1949 Cadillac Engine Condensed Specifications

Type	Valve-in-head, 90 deg. V block
No. cylinders	8
Bore	3 13/16 in.
Stroke	3 5/8 in.
Displacement	331 cu. in.
Compression ratio	7.50 to 1
Compression pressure ..	194 psi @ 1000 rpm
Rated bhp	160 hp at 3800 rpm
Rated torque (max.)	312 lb ft @ 2000 rpm
No. main bearings	5 Durex type
Pistons	Slipper type, aluminum alloy

than at 20 or 40 mph. At the same time it is important to note that the engine will give this performance with the ordinary premium or high octane fuels available at service stations.

This radical engine development was conceived by the Cadillac organization back in 1937, and was being made experimentally in 1941 when the war interrupted further work.

With the new power plant highlighting Cadillac's offerings for 1949, the line remains substantially the same in other mechanical specifications and styling. The same series and models are in the line—Series 61, Series 62, Series 60 Special, and Series 75. The convertible model—which accounted for more than 10 per cent of sales in 1948—remains in the Series 62. It is completely trimmed in leather except for a deep pile

carpeting. Hydraulic controls for actuating the top, all windows, and front seat adjustment are continued.

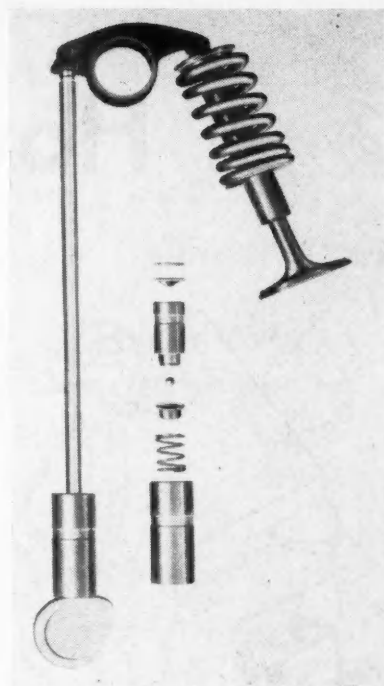
The 1949 models accent a longer hood line with the ornament moved forward while the front end appearance has been altered by the introduction of a new grille which extends across the front fenders to the

wheel openings. Interior treatment is entirely new and features a freshly designed instrument panel and a redesigned flush type instrument cluster on the left side.

Coming to the details of engine design it is important to note that the powerplant is $4\frac{1}{4}$ in. shorter and three in. lower. However, the most striking change is in its weight. The more powerful 1949 engine now weighs approximately 200 lb less than the previous L-head engine.

These radical improvements stem from the combination of many factors, some of which will be described briefly. In the first place there is the shift to a relatively large bore— $3\frac{13}{16}$ in. as compared with $3\frac{1}{2}$ in.—and a shorter stroke— $3\frac{5}{8}$ in. as compared with $4\frac{1}{2}$ in. This has increased efficiency by exposing about 12 per cent less cylinder area to the flame. At the same time the shorter stroke tends to reduce friction losses by cutting piston travel about 20 per cent. More specifically, at around 4000 rpm piston travel is only 2400 fpm as compared with 3000 fpm previously.

Entering into this picture is the adoption of a unique slipper type Stanate finish aluminum alloy piston which permits the use of a connecting rod which measures only $6\frac{5}{8}$ in. center to center, almost two in. shorter than before. This piston design is



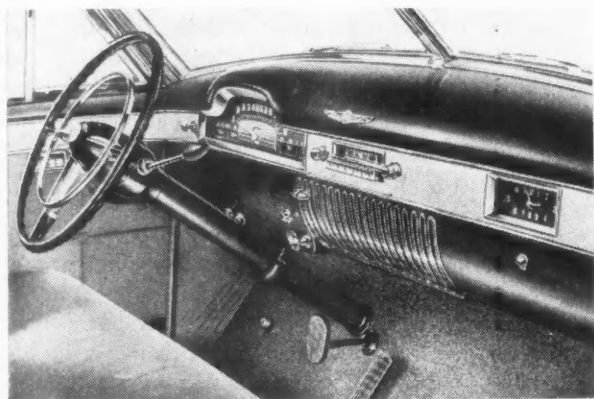
Valve actuating mechanism and exploded view of the hydraulic lifter.

responsible for a tangible reduction in reciprocating weight—in combination with the smaller rods—thus further reducing the effect of inertia forces.

The valve-in-head mechanism incorporates the new hydraulic valve lifters to assure quietness and efficient operation. In this connection it is of more than passing interest to find that the new engine dispenses with an oil filter, relying upon the unique design of the lubrication system and the Floto-type oil level screen to maintain cleanness. The compactness of the valve-in-head construction is responsible to a large extent for the decrease in engine height and weight.

As illustrated, the combustion chamber, of unique design, follows advanced principles to promote better combustion and combustion control. One advantage of this type of chamber is that it has about 10 per

(Turn to page 78, please)



Interior view showing new instrument panel treatment; note also the flush type instrument cluster which replaces the large housing used previously.

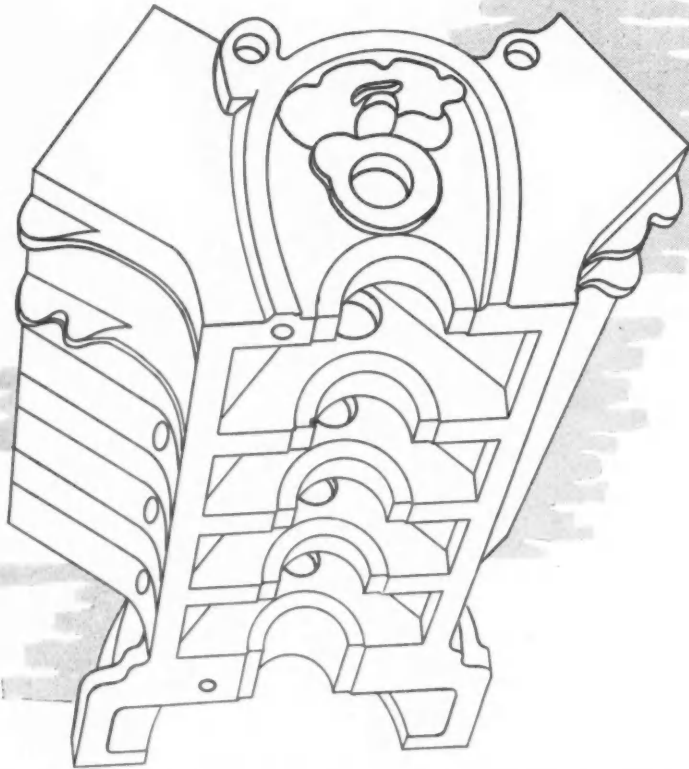


Here is the 1949 Cadillac 60 Special sedan showing new front grille treatment.

How Tooling Problems

By Harold G. Warner

Assistant Master Mechanic,
Cadillac Motor Car Div.,
General Motors Corp.



Underside of cylinder block as viewed from the front end. Five main bearings are now employed instead of the three which previously were used in Cadillac V-eight engines.

INVOLVED in competent planning for the machining of complex castings are such factors as chip removal from machines, type of controls, speeds and feeds, tool life, spindle structure, fixture design, maintenance of accuracy, production rates and adequacy of equipment to perform a specified job. The purpose here is not to discuss these factors in detail, but rather to illustrate by means of a practical example how they enter into the selection of machine tools for modern high speed production.

The discussion will center around the V-type 8-cylinder integral block and crankcase which recently was placed in production on all new machinery. The block is made of GM No. 12-M cast iron, a standard cylinder alloy, with a hardness range of 165,195 Brinell. A production requirement of 20 pieces per hr was involved.

One of the major problems in proper machining of castings on which there are several operations is the establishing of locating points. This stems from the fundamental tool engineering principle of establishing a locating point and returning to this same point for each succeeding operation. The machining of a V-type

cylinder block is a little different from the in-line type because of the angularity of the two banks of cylinder bores with respect to each other. The principal requisite is that these bores be finished with uniform wall thickness. Foundry variations of the most elementary type, such as errors in core setting, core shifting, etc., enter into this problem and must be taken into consideration if accurate locating is to be established. It has been our previous practice to locate inside the cylinder barrels with an equalizing fixture which tended to equalize variations between the extreme cylinders in each bank of four. Any shift of the cores forming the cylinder bores affected this location. The method chosen for locating this new block was to rest the cylinder head faces on three points representing a theoretical V. The side to side or crosswise equalization is obtained by extending the supports of the cores that form the OD of the cylinder jackets and thus make possible a location

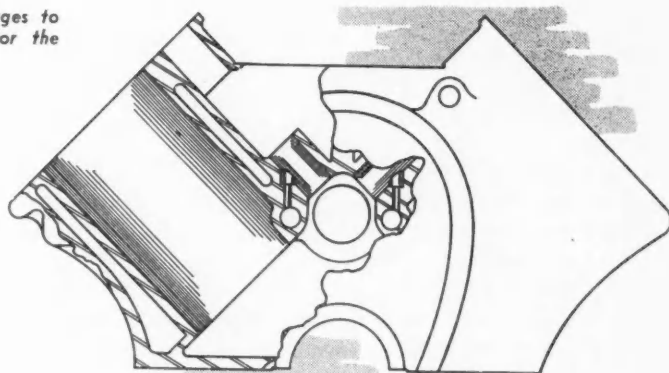
which will permit concentric boring of the cylinder walls. This process was worked out in detail with the foundry, and gages provided to insure its consistency in the castings. The fixture equalizes side to side between extreme cored holes in both cylinder head joint faces. This combined with the three rest points positions the cylinder block vertically and side to side so that the oil pan face can be machined and become a prime locating surface.

First Operation—Mill the oil pan face together with a shallow slot cut longitudinally through the center which later becomes the main bearing location. This provides a prime face and a side-to-side location from this bearing location which gives location in two planes. The establishment of these conditions required very close liaison between the process division and the machine tool builder. The machine for this job has six spindles arranged to rough and finish mill in one operation. Quotations were received ranging from \$38,000 to \$61,000 for the operation including tools. The machine finally selected cost \$44,000. Selection was made after due consideration of conditions or of features insuring ruggedness, freedom from varia-

Were Decided

for Cadillac's New V-Eight Cylinder Block

Here is a sketch showing oil galley holes and passages to the hydraulic lifters which operate the push rods for the overhead valves.



tions, stock removing ability, freedom from maintenance, and adequacy of future design. Due to length of travel of the part for roughing and finishing, production rate was very important and an accurate feed and speed study had to be made.

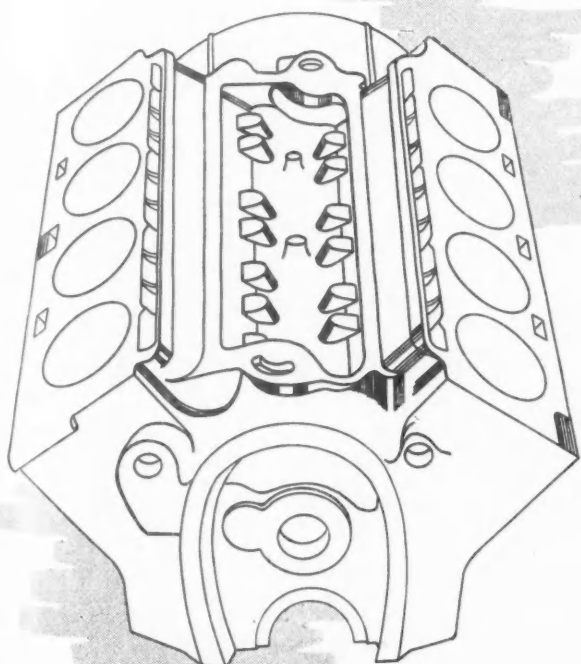
Second Operation—The first operation being completed, it becomes necessary to establish a fore and aft location. With the block still in the same position and squaring up against oil pan face locating crosswise from the bearing lock out and returning to cylinder jacket cored holes for fore and aft location, two dowel holes at extreme ends of the oil pan face are drilled and reamed. These two dowel holes plus the oil pan face then become master locaters for all succeeding operations. One of the prime objectives in tooling this cylinder block was to eliminate as much labor as possible. This dictated the use of station type transfer

machines. On this second operation, while the block was located for the machining of the dowel holes, it was decided to go to a transfer machine and drill all the holes perpendicular to the oil face to save additional handling. Accordingly, a four-station transfer machine was designed with the first locating station producing the dowel holes and succeeding stations doing the rest of the drilling using the dowel holes machined in the first station for locating successive operations.

Various quotations were submitted ranging from \$40,000 to \$61,000. In this case, the \$61,000 machine was selected because it offered a combination of maximum number of operations included, and accessibility for tool changing, simplicity of controls and standard heads for spindles.

Third Operation—Rough mill cylinder head faces and mill valve cover surface. This being a roughing operation the factors affecting the purchase of equipment are rigidity, stock removal ability and tool life. The machines quoted for this job were all adaptations of standard machines. Therefore, price was the determining factor. A hydraulic feed machine was purchased for this operation.

Fourth Operation—In order to reduce labor,
(Turn to page 86, please)



This sketch shows the top and front end of the cylinder block for the new Cadillac overhead valve engine.

Cutting Piston Inspection Costs in Half

A CONTINUOUS, high speed automatic method for the magnetic inspection of pistons which will later be extended to other parts has just been put into operation at the Detroit Diesel Engine Division of General Motors Corp. This method provides for automatic magnetization, spraying with a fluorescent compounded liquid, and de-magnetizing pistons in one operation, reducing the inspection cost by half on each part and improving the quality of the test over methods formerly employed.

By the new method, the

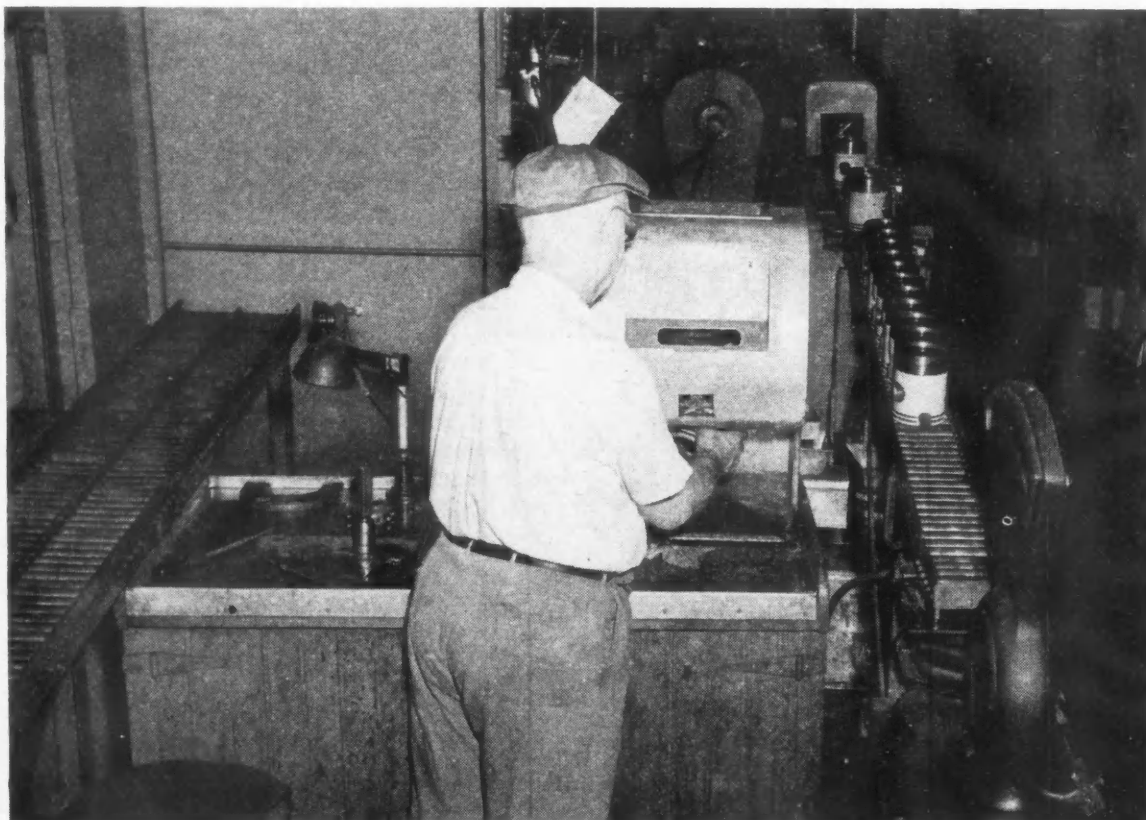
pistons are automatically picked up on a conveyor belt after finish machining operations, and are carried through a magnetic field, during which time the compound is sprayed over and under the part through jets which are fed by a pump. The pump and the magnetic cycle are controlled by an electric eye which synchronizes the process with the passage of a part through the magnetic coil on

the conveyor. The pieces pass through and out of the magnetic field while the current is still on, thus magnetizing and de-magnetizing the piston in one continuous operation. Exhaustive tests have proven that the de-magnetizing does not destroy the orientation of the fluorescent compound around a crack.

At the end of the conveyor line the pieces are examined for imperfections under near-ultraviolet light.

The fluorescent compound, which collects at an imperfection, glows under the light thus high-lighting the defect.

Black-light inspection of pistons at end of conveyor.



Smaller Tires and Lighter, More Efficient Brakes for B-29 Bomber

Bendix has Developed a Landing Gear with Lower Footprint

Loading and Better Load Distribution Between Wheels

THE postwar aircraft program at Bendix Aviation Corp. in South Bend has made some striking contributions in the field of landing gear for military airplanes and promises still further advancement in the near future. While many of the projects are restricted by security regulations, an outstanding example of current accomplishment is found in the fruition of the program for the design of wheels and brakes for the huge B-36 bomber. As the XB-36 this enormous airplane was under experimental development during the closing phases of the war. At the time landing equipment consisted of two 110-in. wheel and tire assemblies, one for each strut. Although this made it possible to conduct

experimental work on the airplane, it was realized that the tire was about at the limit of practical production possibilities. Moreover, the footprint loading and load distribution of the two gigantic tires was altogether out of proportion to the capacity of military landing strips. This coupled with a low factor of safety in the event of a tire blowout made it imperative to change the arrangement radically.

The next phase of development brought about the consideration of four 65-in. tires on each strut, using smooth contour wheels. This, too, had elements of the same disadvantages as mentioned in connection with the 110-in. tires.

It may be noted that Bendix was not involved in either of these projects but during the same period had been doing considerable work on the design of landing gear for jet engine airplanes. The requirements of jet propelled airplanes are unique owing to their structural differences. For example, the wings are narrower and of thinner section than has been the practice, consequently demanding landing gear capable of cradling in a much smaller compass.

This led Bendix to explore the field of smaller diameter, lighter and narrower wheel and tire assemblies possessing loading capacity and durability of the same order or of greater capacity than the larger sizes. At the same time it was necessary to develop smaller and more compact brake assemblies packing more capacity than the larger sizes.

Since these objectives were realized in a practical way in wheel and brake assemblies designed for jet
(Turn to page 66, please)



Bendix landing gear for B-36 bomber. The new 56 x 16 tires are inflated to 175 psi.

"Necked" or "Waisted"

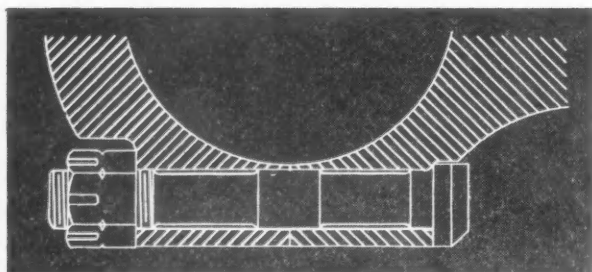


Fig. 1—"Necked" connecting-rod bolt.

ALTHOUGH the advantages of sealed "necked" or undercut studs, screws and bolts have long been known, their use in the production of engines other than those of the aircraft type remains quite limited. A few manufacturers producing high-speed or high-grade engines attach the connecting-rod caps to the rods with "necked" bolts, and during the period when aluminum cylinder heads were in vogue, these generally were secured to the blocks with "necked" studs. In an article by Dr.-Ing. Walter Benz in *Motortechnische Zeitschrift* No. 3 of 1948 it is held that such screws, etc., can be used to advantage not only for connecting-rod caps, but also for main-bearing caps, cylinder heads, crankshaft counterweights, and as "through" bolts holding the cylinder block and head to the engine base. A "necked" connecting-rod bolt is shown in Fig. 1.

Authorities agree that screws and bolts subjected to dynamic loads in service must be preloaded practically to the yield point if they are to have a satisfactory fatigue life. The only alternative is to use comparatively large bolts, but this results in heavy construction. The need for tightening dynamically-loaded screws and nuts adequately yet cautiously was emphasized in an SAE paper by J. O. Almen of General Motors Research Laboratories Division several years ago. To drive home this point Mr. Almen included in his paper a chart intended to show that the responsibility for an adequate fatigue life of such bolts is shared by the designer, the metallurgist, the processing crew, and "the man with the wrench," but that the share of the last named group is many times as great as that of any of the others.

Setting up a standard screw to the point where its material is stressed to the yield point is a relatively delicate operation, for it requires only a slight additional wrench motion to reach the breaking point. This may be explained with the aid of Fig. 2, which appears on this page and shows a conventional

cap screw holding a main-bearing cap in place.

When the screw is being driven home, at the moment the cap comes into firm contact with the block, tension is being set up in the shank and that portion of the threaded section outside the thread in the block. The tension extends to the very end of the screw, but if we assume that the load is uniformly distributed over the length of thread in engagement, it decreases from the point along the length where engagement begins. As the tightening motion continues, the screw elongates elastically up to the point where the stress in the threaded portion outside the block becomes equal to the yield point. Because of the difference between the sectional area of the shank and that at the bottom of the thread, the stress in the shank then is still well within the elastic limit. From stress-strain curves of steel we know that any further increase in the load beyond this point results in a much greater strain or extension than a similar increase within the elastic range. In the case of the cap screw, after the stress in the threaded portion has

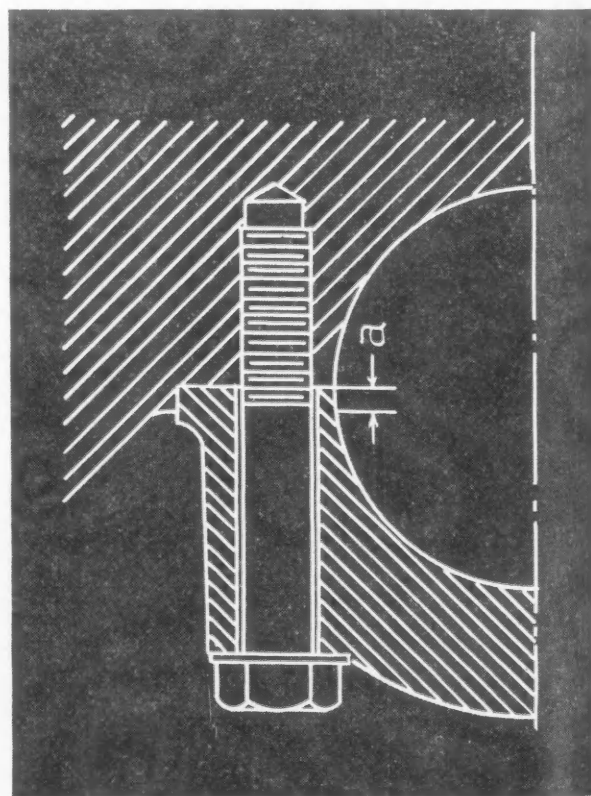


Fig. 2—Standard cap screw holding main-bearing cap.

Screws and Bolts

Their Possibilities in the Field of Engine Production

By P. M. Heldt

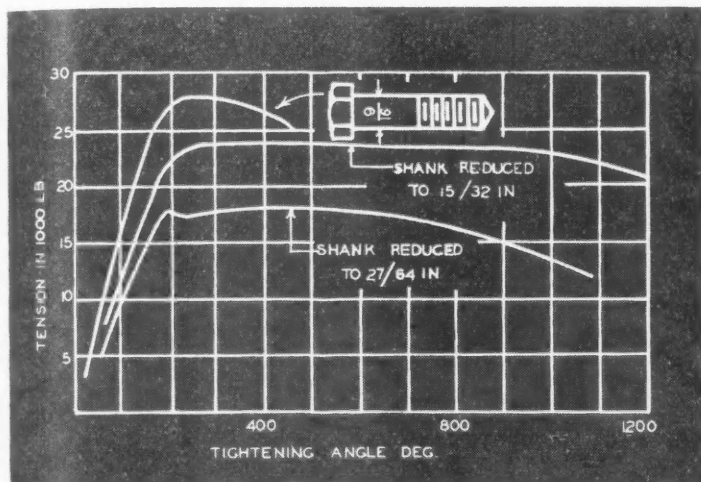


Fig. 3—Stress-strain curves of standard and "necked" screws.

passed the elastic limit, the extension will be confined almost entirely to the short length a (Fig. 2) of the threaded portion outside the metal of the block. The elongation, of course, is substantially proportional to the angle through which the wrench is turned, and because the section to which the elongation is confined is so short, a relatively small angular motion of the wrench—usually less than half a turn—will suffice to carry the stress in that portion of the screw from the elastic limit to the breaking point. With standard screws the break always occurs in the threaded portion.

With a "necked" screw or bolt, such as that shown in Fig. 1, the undercut is made such that the unit stress in the shank is slightly greater than that in the threaded portion. In such bolts the elongation, instead of being confined mainly to the section a in Fig. 2, is distributed fairly uniformly over the whole length of the shank and the projecting threaded portion. Therefore, the screw will "stretch" much more before it fails, and the wrench motion between the point where the elastic limit is reached and that where the screw fractures is greatly increased. This is illustrated by Fig. 3, which shows stress-strain curves of three cap screws all of the same length and the same thread but with different shank diameters. The curves are based on an illustration in Dr. Benz'

article giving results obtained experimentally with screws of 14-mm diameter and 1.5 pitch thread. This corresponds fairly closely to a 9/16-18 screw, and in the tension scale of Fig. 3 allowance is made for the slight difference in diameters. On the basis of its Brinell hardness the material of the screws had an ultimate strength of 159,000 psi. The tension in the standard screw with the full shank diameter of 9/16 in. reaches a maximum value of 28,000 lb after a tightening motion of 250 deg, and the screw fractures in the thread after approximately another half turn. When the shank is reduced to 15/32 in. it is less strong than the threaded portion. The maximum tension which the screw will then sustain is 23,300 lb, but beyond the point where the tension reaches this value the screw can be driven nearly two-and-one-half turns before failure occurs. In this case the fracture will be in the shank, which will show a pronounced contraction at the point of fracture. When the shank diameter is still further reduced, to 27/64 in., the maximum load sustained will be only 18,200 lb and the fracture, of course, will again occur in the shank. For a 14-mm screw with 1.5 pitch thread it was found that the point of fracture shifted from the thread to the shank if the shank diameter was reduced below 1.08 times the minor diameter (bottom diameter) of the screw head. A reduction of the shank diameter below the minor thread diameter therefore

(Turn to page 82, please)

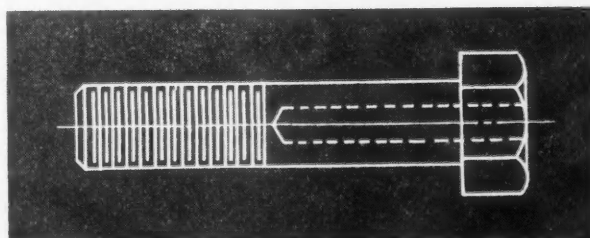
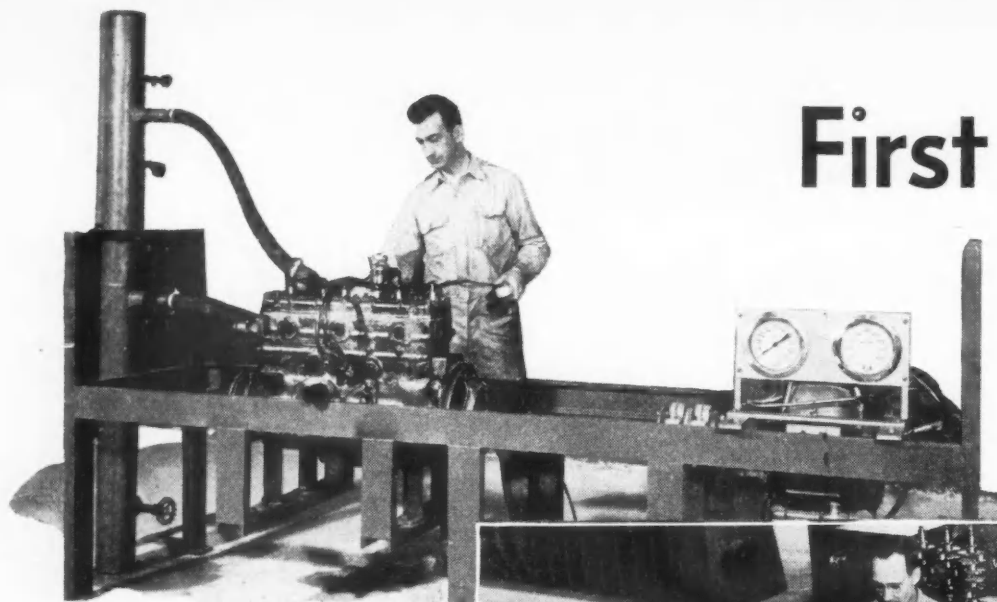


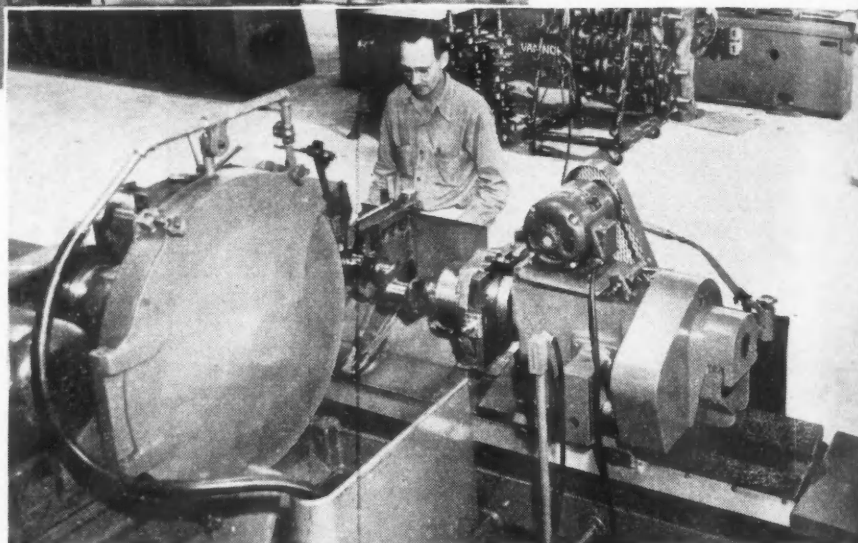
Fig. 4—Drilled cap screw.

First of IHC of



(Left) When completely rebuilt, engines are tested for performance on the dynamometer.

(Right) Here is one of the three machines employed for regrounding crankshafts.



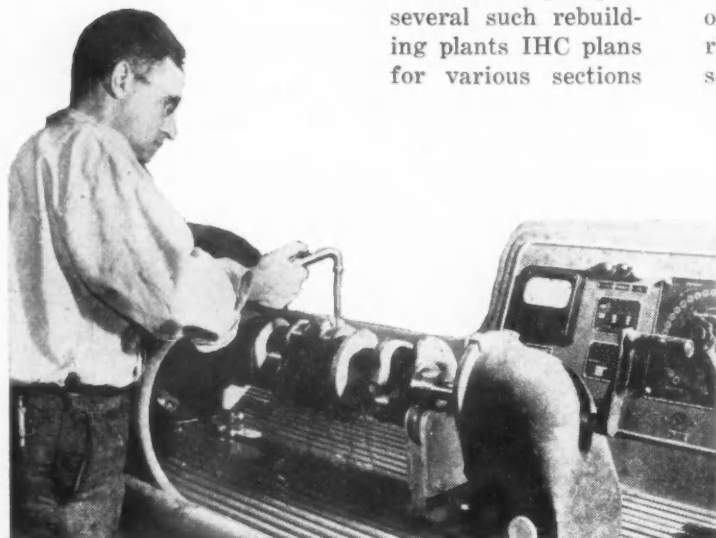
A COMPLETE plant for rebuilding of International truck units has been placed in operation in the 200,000 sq ft International Harvester West Coast Parts Depot which was established recently at Richmond, Calif. Enough machinery and other equipment have been installed to recondition as many as 40 truck engines, plus 50 crankshafts, 75 clutches, 100 carburetors, and 100 brake shoes on each eight-hour shift. Employing about 100 men when running at capacity, it is the first in a group of several such rebuilding plants IHC plans for various sections

of the country.

For several years International truck branches have been equipped to rebuild such parts as carburetors, clutches and brake shoes. But this is the first time the entire rebuilding procedure has been centralized into one large operation.

At Richmond, International has applied the principle of mass production on an assembly line basis to the rebuilding of truck units. Separate lines have been set up for reconditioning engine blocks, generators, crankshafts, starters, clutches, carburetors and electrical parts.

Parts are tested and inspected at every stage of work. At the beginning each crankshaft is Magnaflux inspected and is junked if it shows any sign of possible failure. Reconditioned engines are tested on dynamometers and carry the same service warranty as new engines.



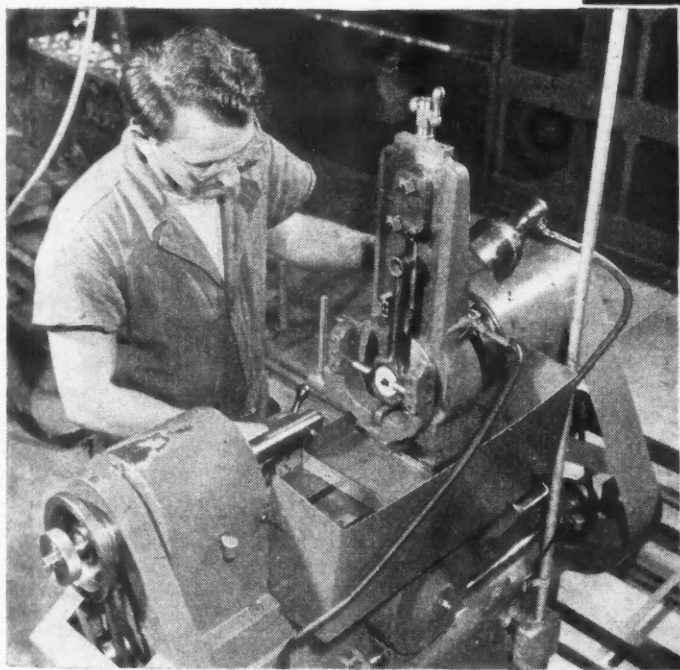
Magnaflux testing of used crankshaft before proceeding with further work. Parts which do not pass this test are junked.

C of Nation-Wide Chain Truck Unit Rebuilding Plants

At Richmond, California, International has applied mass production technique on an assembly line basis to the rebuilding of truck units.



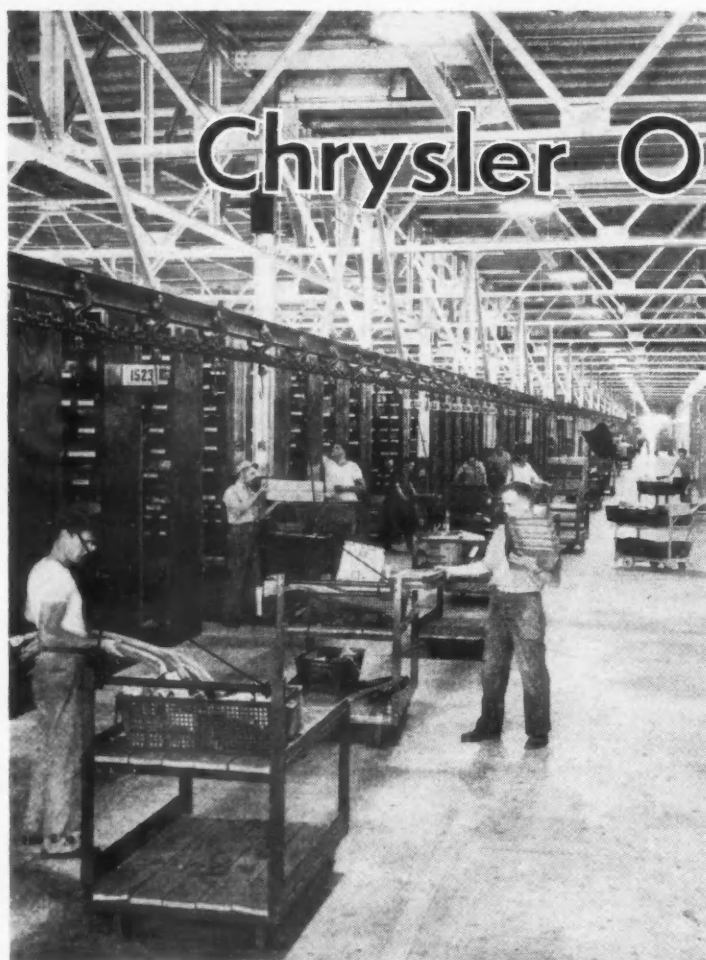
(Above) Pistons are ground to size on machines of the type shown here.



(Above) After connecting rods have been inspected for defects and accepted as reusable, they go to grinding and boring machines.



(Right) Portable machines are used for rebor cylinders.



Chrysler Opens Another Parts Plant

On this packing line at Chrysler Corp.'s Delaware Parts Plant, parts ranging from tiny bolts to 1100-lb engines are packaged for shipment.

IN DEDICATING Chrysler Corp.'s first plant in the East on Oct. 8 at Newark, Del., Frederick C. Bahr, vice president and general manager of Chrysler's Parts Div., said that this new 700,000-sq ft plant would be the parts distributing center in the East, serving 14 states from Maine to the Carolinas. It is one of five major Chrysler parts distributing plants in the U. S. The others are located in Marysville, Mich., for the Great Lakes area; Atlanta, Ga., for the Old South; Kansas City, Mo., for the Middle West; and San Leandro, Calif., for the West. Mr. Bahr stated that no other new parts distributing plants are contemplated, but that improvements and modernization are continually taking place in the other plants.

It is expected that about 500 persons will be employed in the Newark plant when it is operating at full capacity. About 23.5 thousand different types of replacement parts are stocked in quantities ranging into the millions. As an example of the diversity of the parts stocked in the plant, orders were recently filled for a radiator shell, and cylinder head for a 1919 Maxwell and for 400 radiator shells for 1921 Dodge automobiles in South America. A school for parts and service sales will hold training classes in the new plant.

One section of the half-mile long continuous conveyor line at Chrysler's Delaware Parts Plant.

M-98—General Purpose Medium Size Lathe

A medium size, general purpose lathe of new and improved design has just been introduced to the machine tool industry by the Rockford Machine Tool Co., Rockford, Ill.

The new lathe features an all-g geared headstock, with a range of 12 spindle speeds, all quickly adjustable by means of conveniently located levers. The spindle is made from a high alloy steel forging, mounted on Timken zero-precision bearings. Spindle nose has a No. 1 tapered key drive. Headstock gears are cut from pre-heat treated steel gear blanks, annealed, hobbled and shaved to obtain highest precision. Positive gear lubrication is assured by an immersion and oil-splash system. Overall design of the headstock permits all types of lathe operations, including high spindle speeds and the use of tungsten carbide cutting tools.

Pick-off change gears, reverse gears, V-belts and similar parts and assemblies are accessible for adjustment or repair through the hinged door on the headstock end of the lathe. All moving parts, with the necessary exception of the spindle nose, are protected to provide full safety for the machine operator.

M-99—Hydraulic Feed Drilling Unit

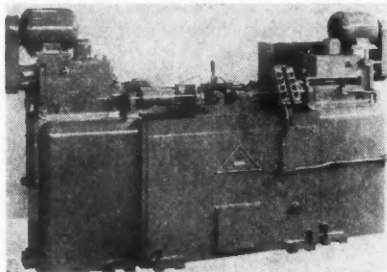
An improved hydraulic feed drilling unit has been put out by LeMaire Tool & Mfg. Co., Dearborn, Mich. This No. 1000 unit is the smallest of the line of hydraulic feed drilling units manufactured by LeMaire. It is driven by a 1½ horsepower or 2 horsepower motor and as it is used with small tools that do not require a heavy thrust, a single ram only provides the hydraulic feed. The feed rate is 135 in. per minute for rapid approach and return and slow feed can be varied from ½ in. to 35 in. per minute by merely turning a dial. Movable cams, mounted on a



For additional information regarding any of these items, please use coupon on page 56.

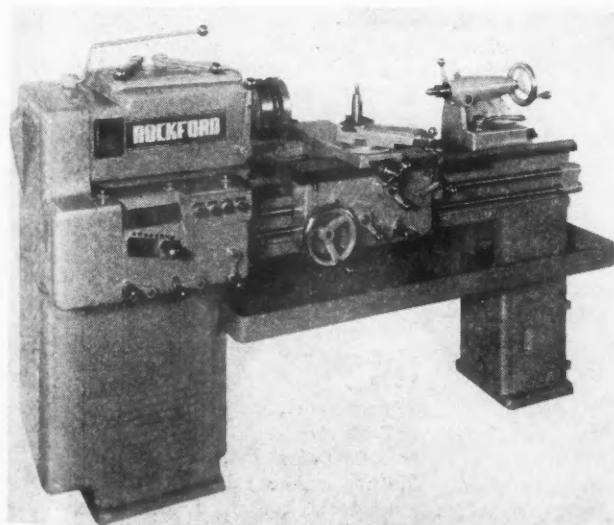
cam bar, control the length of feed up to a maximum stroke of 4½ in. The same motor that drives the spindles also drives the hydraulic pump.

The pump speed is kept constant with spindle speeds being varied from 365 rpm to 4810 rpm by using various pairs of speed change gears, which are easily replaced. The spindle may be arranged with a flange for use in mounting a multiple spindle head as shown in the



LeMaire feed drilling unit, No. 1000

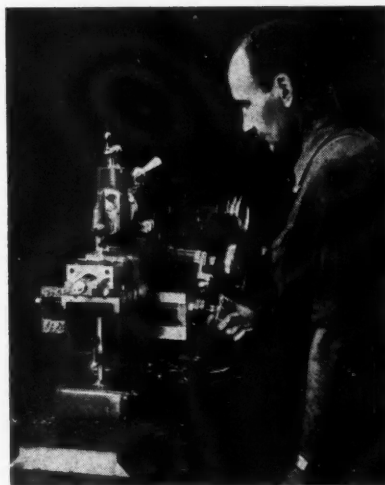
photograph or may be used as a single spindle unit with No. 1 or No. 2 Morse Taper. Units may be mounted horizontally, vertically, or at any angle. They are used in building up machines as shown or the units may be purchased separately for application to existing machines to handle an added operation.



Rockford general purpose lathe.

M-100—Small Size Bench Shaper

South Bend Lathe Works, South Bend 22, Ind., has brought out a 7-in. bench shaper to meet toolroom and industrial needs for a small, accurate shaper. The ram has dovetailed ways,



South Bend bench shaper.

zero to 7-in. stroke regulated by a graduated eccentric adjustment, stroke rates of 42 to 195 per minute, and cutting speeds of three to 114 fpm. Tool head mounting is 3½ in. in diameter and graduated 0 to 90 deg left and right with a positive head assembly lock. The tool head has a vertical feed of 3 in. with its feed collar graduated in thousands of an inch, the toolpost takes a shank ⅜ in. by ⅞ in., and the head is equipped with a swivel clapper box.

The table is 57/16 in. by 5 in. by 6 in. deep with three slots in the top and each side; horizontal travel is 13 in. and vertical travel 5 in. Its reversible power cross feed is 0.002, 0.004, 0.008 and 0.016 in. per stroke. Distance to ram is 5½ in. maximum and ½ minimum. The table vise opens to 4 in. with a base graduated to 0 to 90 deg right and left, and can be mounted on the top or right side of the table.

A 1/3 hp, 1725 rpm motor is required. V-belt drive through the countershaft and four-step cone pulleys provides four speed changes of the ram's stroke.

M-101—Motor Driven Mechanical Separator

A new Roto-Finish mechanical separator is announced by the Sturgis Products Co., Sturgis, Mich. It is a motor-driven unit for removing parts from chips or separating mixed chips into the various sizes.

The new separator consists of a welded steel frame with an inclined surface on which is located a Roto-Finish hoist pan serving as a hopper, and a waist-high separating table which supports a mechanized shaker screen assembly. The inclined surface for the hoist pan support is adjustable for cor-

rect gravity flow of parts and chips onto the screen.

The shaker screen assembly can be elevated from a horizontal to an inclined position with a height of 4 in. on the end nearest the hoist pan. This height plus the reciprocating motion provided by the motor drive separates parts from Roto-Finish chips and automatically discharges the former at the opposite end. The screen assembly is tapered at the discharge end and provided with a vertical lift gate so that parts do not leave the screen before the separation is complete.

The stroke of the screen assembly can be changed to provide varying amounts of agitation, depending upon the requirements of the separation. The separator is equipped with a detachable tote pan shelf.

Motor drive can be either a 110 or 220-440 volt, 3 phase, 60 cycle, geared-head $\frac{3}{4}$ hp electric motor with control switch.

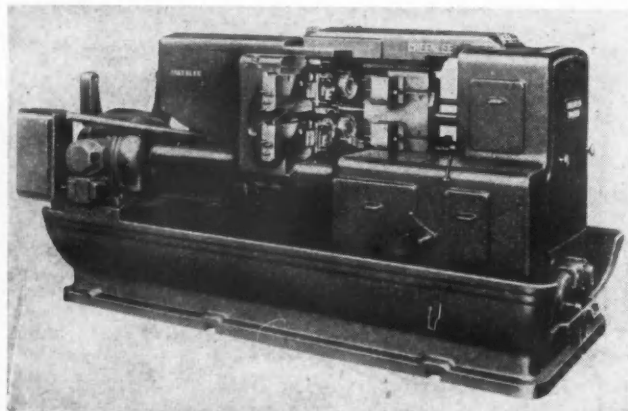
The new separator can be used with either the Roto-Finish CW-45 or CW-60 hoist pan. Screens 27 in. by 32 in., with varying meshes, are available for all sizes of Roto-Finish chips.

Overall dimensions of the unit are 95 in. long, 70 in. high and 40 in. wide.

M-102—Four-Spindle Screw Machine

Greenlee Bros. & Co., Rockford, Ill., have made several revisions on their 2½ in. four-spindle automatic screw machine. An overarm has been added which gives the machine a more streamlined appearance, and at the same time increases the rigidity of the spindle-carrier housing, permitting the use of heavier tooling. The main tool slide has also been strengthened by the addition of gibbed ways fastened to the overarm. The new Greenlee main clutch unit insures positive feed for handling heavier cutting loads.

The four parallel-mounted cross slides are actuated through a system of cams which are quickly interchangeable. Other features of this four-spindle automatic screw machine include rapid adjustment of the main tool slide stroke through use of a graduated worm-wheel; an easily accessible tooling area for quick set-ups and easy



Greenlee four-spindle automatic screw machine.

NEW Production and Plant EQUIPMENT

For additional information regarding any of these items, please use coupon on page 56.

operation; and standardized, interchangeable tooling. The 2½ in. automatic handles work up to 8 3/16 in. in length.

M-103—Machines for Boring, Drilling and Tapping

Models C2A, C3A and C4A Holes-steel vertical machines, announced by the National Automatic Tool Co., Richmond, Ind., are production machine tools adaptable for drilling, boring, tap-

change gears permit spindle speed variations. Electrical pushbutton control provides for routine and set-up control from a central station. Models C2A, C3A and C4A machines are of both single spindle and fixed center multiple spindle construction.

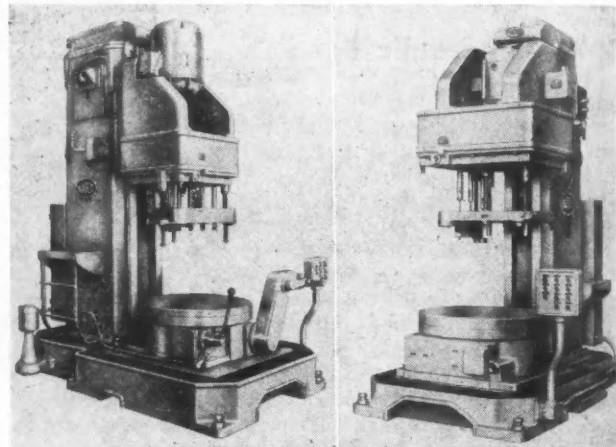
Each model can be supplied with either large or small base. The small area base is supplied for adjustable table applications or for stationary fixtures mounted on the base. The larger area base is suitable for rotating and sliding type fixture applications.

Models C2A and C3A Holes-steel machines can be supplied with an adjustable knee type table. The entire assembly has a vertical adjustment of approximately 12 in. through a crank-operated elevation screw.

A heavy box section column has ways of close grain, high tensile cast iron. Hardened the ground steel ways can be furnished at an additional charge.

The single spindle head is direct motor driven and anti-friction mounted. Sliding gears which are lever operated allow a selection of seven spindle speeds within the range selected through splined pick-off gears.

Fixed centered multi-spindle heads are designed for the individual requirements. These heads are anti-fric-



NATCO C2A and C3A machines.

ping and similar operations on high production as well as general miscellaneous work. The electrically-controlled hydraulic feed system provides an infinitely variable feed selection within the specified range. Where provided,

tion mounted where center distances will permit. Combination drilling and tapping heads are provided with an independent reversing type motor for the tapping spindle drives.

A head traverse power cylinder is mounted between the ways at the top of the column, and through a control system provides a cycle sequence of rapid advance, coarse feed, fine feed, rapid reverse and stop.

M-104—Steam Atmosphere Furnaces

New addition to the line of furnaces developed by Leeds & Northrup Co., Phila., Pa., is said to make steam-atmosphere tempering and strain relief of metal parts thoroughly practical, by means of the Steam Homologous Method of heat treating. High-speed steel tools, cast iron, sintered powdered iron compacts and non-ferrous al-

loys are being treated by this scale-free method, at temperatures up to 1150 F.

By adding a protective steam atmosphere to the well-known Homo forced-convection heating and its Micromax temperature control, the method, reports indicate, is enabling heat-treaters to turn out steel parts with a uniform blue oxide finish. Parts are free from scale, have improved machinability, increased resistance to corrosion and wear, and are easier to clean for subsequent plating, it is stated. High-speed tools, for example, exhibit improved life when cutting hard abrasive materials. Powdered iron parts, after steam treating, have greater density and hardness.

Steam from a process line or a smaller boiler is fed into the work chamber through an inlet in the bottom of the furnace. Although especially designed for steam tempering, the furnace can also be run with natural atmosphere, like any conventional Homo Tempering Furnace.

M-105—Broaching and Assembly Press

The new G6-S-W-C self-contained machine designed by the Greenerd Arbor Press Co., Nashua, N. H., is said to offer minimum of deflection for broaching and assembly requiring accurate alignment, used for wet or dry broaching, assembly, and die works.

Its 2 7/16 in. in dia high alloy steel heat-treated and ground ram is guided on heat-treated and ground ways to keep the ram in line.

The cylinder is honed to size and fitted with cast iron piston rings, and the ram is sealed with chevron type asbestos and neoprene packings.

Speed of the ram down is adjustable from 20 in. per minute to 300 in. per

NEW Production and Plant EQUIPMENT

For additional information regarding any of these items, please use coupon on page 56.

minute, with a return speed up at the rate of 460 in. per minute. The press is equipped with coolant for wet broaching, and it may be furnished with dual ram control.

The G6-S-W-C has a maximum pressure of six tons; is driven with a 10 hp motor, interconnected by three V belts with hydraulic pump, and the pressure may be adjusted from 3/4 to 6 tons. It receives up to 12 in. dia; maximum daylight 21 in.; minimum daylight 3 in. Ram travel is adjustable from 1 to 18 in., controlled by power stops. The work table is 17 in. wide, 10 in. deep, with 3 1/2 in. corded hole central with ram, with oil gutters.

M-106—Heavy Duty Spot Welder

Electric-Arc, Inc., Newark, N. J., announces availability of its new line of electro-weld spot welders for fast, economical production. The equipment il-

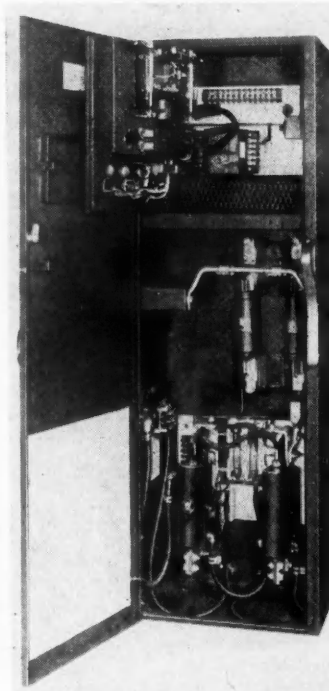
removable top and rear door for ease of inspection.

The equipment operates on 220 volts, 60 cycles, single phase AC. If desired, the units can be furnished with magnetic contactors and weld timers.

M-107—Non-Synchronous Welder Control

Latest model Weltronic non-synchronous control combination for foot-operated spot, projection and butt welders is made available by the Weltronic Co., Detroit, Mich.

The Series K. provides simplified installation by combining the main line

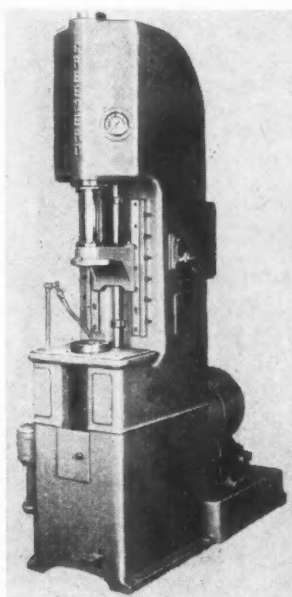


Weltronic control combination for spot, projection and butt welders.

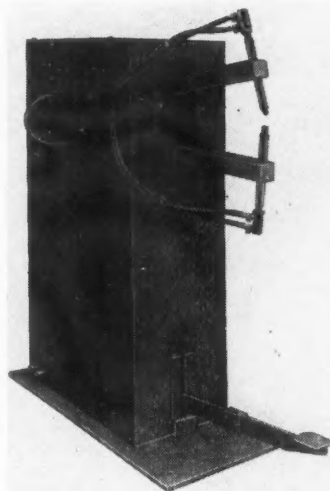
disconnect switch within the unit, so that power lines may be brought in directly. Available in floor, side-of-welder or wall-mounting styles, the cabinet houses a NEMA 1A, 3B or 5B timer, fusible or non-fusible disconnect switch, line fuses, and an ignitron contactor.

The timer panel is of the usual Weltronic "plug-in, swing-out" construction permitting interchanging 3B and 5B timers in less than one minute for conversion. Opening of the front panel provides access to resistors, condenser, transformer and wiring. Each time period is independently adjustable. Power supply unit is universal for all timers and operates on 208, 230, 380, 460 or 575 volt power source.

The ignitron tube contactor accommodates two A, B or C tubes, includes internal water lines and connections, buss supports, thermal flow switch, fuses for ignitron protection and a surge suppressor for connecting across the primary of the welding transformer. Overall height is from 48 in. to 60 in. for the five models offered.



Greenerd G6-S-W-C broaching and guided assembly press



Electric-Arc spot welder

lustrated is a heavy-duty unit featuring 8-step current control permitting 75 per cent secondary voltage adjustment.

The electrodes are standard size, water cooled and easily and quickly renewed. The equipment features a spring-loaded foot switch, ample ventilation and arc welded steel casing with

P-89—Ultrasonics Materials Tester

A new device, known as the ultrasonics materials tester which uses high-frequency sound waves to discover and record small flaws in metals, has been developed in the general engineering and consulting laboratory of the General Electric Co., Schenectady, N. Y.

The instrument shoots 1,000,000 cycle-per-second sound waves through the metal to be tested, and simultaneously plots a graph which indicates any flaws in the metal's interior.

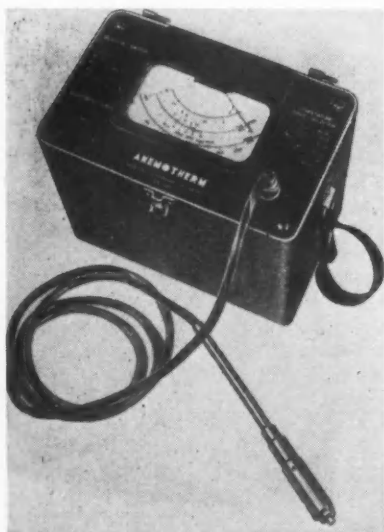
Testing of metals with the new instrument is carried out by immersing the specimen in oil, since these sound waves will not travel through air. A small "transmitter" wired to the main body of the instrument and also immersed in the oil, sends the sound through the oil and through the metal specimen. The sound wave continues in its original path until it reaches the "receiver" on the far side of the container, or until it is interrupted by any crack or fault in the metal. A dial on the instrument indicates this flaw, while the line on the permanent graph dips sharply.

The "transmitter" is a small crystal made to vibrate and produce sound waves by an electric current. The "receiver" is a similar crystal, mounted opposite the "transmitter" and connected to a separate power supply.

P-90—Meter for Air Velocity and Temperature

A new three-way air meter, called Anemotherm, which gives air velocity, air temperature and static pressure readings at the turn of a knob, was recently placed on the market by the Anemostat Corp., of America, New York, N. Y.

Engineers, architects, contractors and installers are said to find the new instrument invaluable for adjusting and testing equipment used for heating,



Anemostat "Anemotherm," three-way air meter



For additional information regarding any of these items, please use coupon on page 56.

ventilating and air conditioning. The probe is small and is attached to a long flexible cable. Thus, readings are easily made anywhere—even in the neck of an air diffuser. Anemotherm, operating on self-contained batteries, weighs only 11 lb and is readily portable.

The new meter measures air velocity from 10 fpm to 5000 fpm. The instrument provides rapid-response measurement of temperatures from 30 F to 155 F. Either negative or positive static pressure may be read directly in inches of water, from 0.05 to 10 positive and 0.05 to 4 negative. It gives instantaneous direct readings without the necessity of timing, calculation or reference to tables or graphs, detecting even the slightest drafts.

The Anemotherm is particularly valuable in measuring velocity and temperature of air confined in ducts, air currents in free spaces, and air entering or leaving through air outlets and inlets.

P-91—Portable Push-Pull Tappers

New "push-pull" tappers are the latest addition to the line of portable air tools manufactured by the Aro Equipment Corp., Bryan, Ohio.

These new Aro tappers are automatically reversible—the operator merely pushes the tool for forward rotation, and pulls for reverse. They are offered in twelve new models with a speed range including 450, 750, 1100, and 2500 rpm. The tools are suitable for all tapping operations up to 1/4 in. capacity in 1/2 in. sheet steel and cleaning up to 3/8 in. tapped holes.

Features of these tools include higher torque, provided by a secondary planetary gear system supplementing Aro's "O" series motor; variable speeds for maximum efficiency in an unlimited field of metals; three types of tool control (piston type, button and lever) offering throttle selection to suit the operator and the specific job; and simplified tap changing and adjusting by means of the new type Jacobs tapping chuck.

Standard equipment includes a 10 5/16 in. Jacobs tapping chuck complete with wrenches, speed regulator,

and 8 feet of 1/4 in. hose and fittings. The 1/4 in. tapping chuck is optional. The piston type tappers are 11 in. long,



Aro portable "push-pull" tapper

and weigh 3 lb, 9 oz. The button and lever type tappers are 10 1/2 in. long, weighing 3 lb, 1 oz.

P-92—New Tire for Farm Tractors

Two years of development and testing by Goodyear Tire and Rubber Co., Akron, Ohio, are said to have resulted in a rear farm tractor tire named Super Sure-Grip, with tread width in-



Goodyear Super Sure-Grip rear farm tractor tire

creased for broader ground contact, to afford greater tractor drawbar pull. Tread design is new and evenly spaced for smooth rolling operation.

Longer tread bars with increased bar depth at the shoulder supply full depth bite for the full length of the bar. Sizes range from 6-24 to 15-32, including the popular 9-38 and 13-38 sizes.

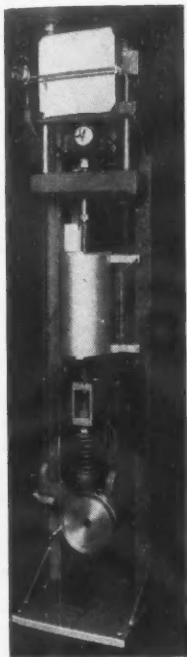
P-93—Phenolic Casting-Type Resin

Plastitool, a phenolic casting type resin, is offered by the Calresin Corp., Culver City, Calif., as a unique material for making production tooling such as forming dies, nesting and checking jigs, foundry matchplates, and patterns for foundries and duplicating machines. The advantage of this material is found in the ability to duplicate models developed in clay, plaster, or wood quickly at

low cost, eliminating the cost of steel tooling.

Plastitool is a pale amber liquid phenolic casting resin of extremely low viscosity. Being thermosetting, it is handled merely by mixing the liquid resin with a catalyst in the cold state, pouring it into molds and curing in a simple warming oven at 150 F. The material cures to an opaque ivory white casting with a surface hardness 90 per cent that of heat treated dural with compressive strength of 16,000 psi. The resulting casting can be machined, sanded, and buffed.

P-94—Motor-Driven Creep Testing Machine



Baldwin screw type creep testing machine

A new motor-driven, screw type creep testing machine of 20,000 lb capacity, designed for short-time, creep-rupture tests at high temperatures with a minimum of operator attention, is announced by the Baldwin Locomotive Works, Testing Equipment Dept., Phila., Pa. The machine automatically maintains constant loads up to 100,000 lb per sq in. on standard 0.505 in. dia specimens while temperatures are held constant up to 2200 F. Tests may run for 10 to 400 hours.

A feature of the machine is a flat 10-in. by 10-in. chart recorder panel in front, with which no extensometer is required and no strain readings need be made. This avoids drawing of curves manually from recorded data. The elongation versus time curve is automatically and accurately drawn on the chart from the start of the test until rupture occurs. It is said to assure much greater accuracy at the final point of the curve, or for plastic strain at rupture, than hitherto possible by the conventional practice of measuring after rupture by fitting the two broken ends of the specimen together.

The recorder panel is driven vertically with the elongation of the specimen by the driving mechanism of the loading screw. The recorder pen is driven horizontally by a clock mechanism. Elongation is also indicated by a revolution counter which can be read directly in thousandths of an inch. It is operated by direct flexible shaft connection with the screw jack drive shaft.



For additional information regarding any of these items, please use coupon on page 56.

Change gears in the elongation drive to the recorder give 1, 2 and 4 per cent elongations per inch.

The specimen is loaded below through gearing by means of a large, electric-motor-driven screw having a stroke of approximately 4 in. The top end of the specimen is supported by a stiff, heavy spring block on which the constant load is maintained by keeping a constant deflection. The deflection of the spring block is measured by a dial gage with an electrical contact. The electrical contact controls the motor that drives the screw. Thus, a constant deflection is maintained in the spring block and a constant load is applied on the specimen during its elongation. When the specimen ruptures, the control circuit (of which the specimen is a part) is broken and both motor and clock are stopped.

The new machine can also be adapted readily to short-time tensile tests, constant strain-rate tests, or relaxation tests. The machine weighs approximately 1200 lb, is 7 ft high, and requires a 16 in. by 30 in. floor area.

P-95—Highly Concentrated Liquid Detergent

A liquid detergent recently placed on the market by the Automotive and Aviation Service Division of Dretex Corp., Detroit 32, Mich., quickly and thoroughly cleans dirt, grease and grime from automobiles, trucks, tractors, trailers, buses and coaches of all kinds, and aircraft. It is also said to be an excellent general-purpose cleaner.

Marketed under the name of "Drex-Foam," this cleaning material possesses unusually effective cleaning and wetting properties so that the surfaces cleaned dry to a sparkling finish. It leaves no streaks, smears, or harmful effects on fine finishes or waxed and polished surfaces. This general-purpose detergent contains no abrasives or harsh alkalis that would scratch or dull surfaces or attack the skin of the user, according to Dretex.

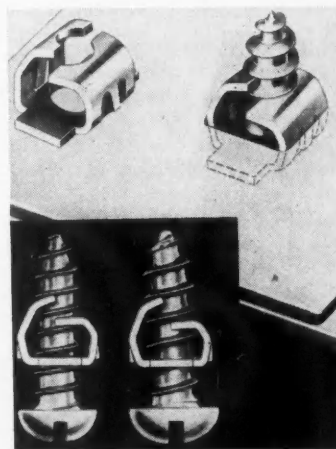
As Drex-Foam is highly concentrated, most cleaning applications require the use of only 1½ to 2 oz to a gallon of water. On metals and painted surfaces,

a pre-rinse with plain water may be used, and while wet, the dilute solution of Drex-Foam is sponged or flooded on the surface. The solution may be used either warm or cold. Dirt, soil and grease are immediately removed in swirls of protective foam and bubbles. As Drex-Foam is free rinsing, the surface is then flushed with clean water.

For cleaning upholstery, a lather can be worked up and sponged on the surface to remove dirt and grime.

P-96—Snap Nut for Blind Attachment

Offered by Prestole Corp., Toledo, Ohio, a new spring steel "Snap Nut" is said to make quick work of anchoring nut-to-panel for blind attachment. No welding, riveting, clinching or special tools are necessary. The nut is simply



Prestole spring steel snap nut

pressed into assembly position attached directly from the work surface, instead of from the reverse side of the panel. It snaps into a 9/32 in. square hole in panels 0.037 in. to 0.055 in. thick, and is designed for easy entrance of the screw, even in cases of extreme misalignment of panels.

As the screw is driven, the arched spring arms of the nut expand just enough to permit entry of the screw, locking the fastener to the inner panel, and at the same time binding against the root of the screw thread. The new fastener accommodates both No. 8 and No. 10 sheet metal screws, the larger size merely expanding the spring arms further apart. It is said to withstand a tightening torque of 35 to 45 inch pounds.

P-97—Low-Hydrogen Type Coated Electrode

For the purpose of preventing underbead cracking in weld deposits a low-hydrogen type coated electrode called Airco No. 394 is being offered by the Air Reduction Sales Co., N. Y., N. Y.

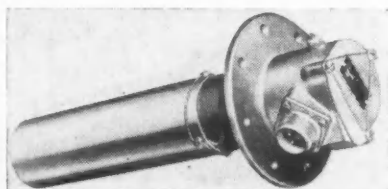
The new electrode operates on either

(Turn to page 76, please)

U-9—Float Switch for Fuel Systems

A type of float switch incorporating the float in a tube has recently been introduced by Hydro-Aire, Inc., Burbank, Calif. The manufacturer states this new switch eliminates hazards of jamming, bending and accidental operation in fast dives or climbs, and, because it is unaffected by sloshing of fuel, assures greater accuracy.

The float switch features fully-enclosed electrical circuit, minimum space and clearance requirements, wide ad-



Hydro-Aire float switch

justment range, easy external adjustment after installation and suitability for top, bottom or side mountings. The 10 amp switch is Air Force-approved and is designed to operate in fuel systems without the addition of relays.

U-10—Heat-Resisting Adhesive Materials

Two new and improved thermal barrier materials capable of effectively withstanding temperatures as high as 2,800 F. have been added by the American Latex Products Corp., Los Angeles, Calif., to its line of "Stabond" cements, adhesives and allied compounds.

These new sealing compounds, known as Stabond FR 8 and FR 10, are obtainable in various consistencies for application by trowel, brush or extrusion gun and have a wide range of applications in the aircraft industry.

In test, an oil tank covered with a 1/8 inch coating of FR 10 is claimed to have withstood a 2,000 deg flame blast for 36 minutes without damage to the underlying metal. The metal of an unprotected tank was burned through by the same flame in a one-half minute.

The compounds are practically suitable for application as an insulating material to electrical junction boxes, heat exchanger couplings and similar points, as well as for sealing engine nacelles, and lagging hot air and exhaust gas ducts. They also may be used as an abrasion-resistant coating for electrical systems.

Stabond FR sealing compounds are thermal barrier materials initially of a plastic nature, and may be used for filleting or applied to a spherical surface. They "cure" by solvent release at approximately 80 F. forming a hard but not inflexible sheath which may be given greater resistance to air and flame abrasion by incorporating additional support, such as perforated glass cloth or similar material, at the time the sheath is formed.

FR 8 satisfactorily resists tempera-

NEW

Products for

AIRCRAFT

For additional information regarding any of these items, please use coupon on page 56.

tures up to 2,000 F. FR 10 has properties similar to those of FR 8 but is made of materials having a greater refractive power and has been treated at 2,800 F. for 15 minutes with satisfactory results. It is said to withstand considerably higher temperatures intermittently.

U-11—Air Valve for High Temperatures

A new air valve, said to operate in any air flow system utilizing high temperature—high pressure conditions has recently been put out by the Industrial Design Laboratories, Culver City, Calif.

It was designed specifically for use on turbo-jet aircraft to modulate air flow, as well as serve as an on-off valve in a cabin air conditioning sys-



Air valve of Industrial Design Laboratories

tem or wing empennage anti-icing system.

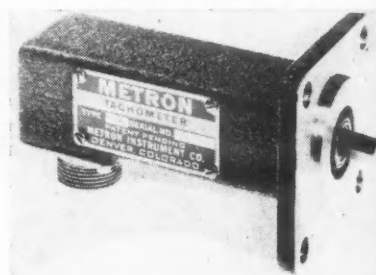
Among its claimed operating advantages are good seal in any position (leakage rate of less than 0.15 lb per minute), low actuating torque requirement of less than 200 in.-lb, complete absence of any parts subjected to sliding friction, double-duty service either as a modulator to control air flow or as a shut-off valve.

Industrial Design Laboratories states the valve has a pressure range from 0 to 140 lb psi gage, and a temperature range of -65 F. to +500 F. The electric actuator conforms fully to AN-M-10a specifications; power con-

sumption is 1/2-1 amp at 24-28 volts DC. Time required for actuation from the closed to open position is 20 to 25 seconds, depending upon the actuator used. Present diameter of the port is 3 1/2 in., but a 4 1/2 in. port-diameter valve is now under development. Weight of the valve is 14 1/4 lb.

U-12—Tachometer Head for Pad Type Mountings

Small size and light weight characterize the new Metron type 55 tachometer head for AN specification pad type aircraft mountings, manufactured by Metron Instrument Co., Denver, Colo. For use with all Metron indicators these heads employ an electric contact making mechanism which af-



Metron type 55 tachometer head

fords sustained accuracy and long life. Tests show over 2 billion revolutions without maintenance or loss of accuracy.

Weighing only 11 ounces and requiring very small operating torque, these heads permit full scale indicator ranges as low as 200 rpm or as high as 10,000 rpm. Life and accuracy are said to be unaffected by vibration or temperature changes over wide limits. Electrical connections are made with standard AN fittings and the overall projection from the mounting surface is only 4 1/8 in.

U-13—Plastic Coating for Alclad Metal

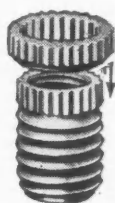
A new plastic coating for retarding rain straining, corrosion, surface oxidation and tarnishing of Alclad metal surfaces, especially for use on aircraft, has been developed by the Sherwin-Williams Co., Cleveland, Ohio. The new protective material is transparent and provides a non-yellowing plastic film of about one molecule thickness when applied on metal surfaces.

Known as Molyclad, the coating is free from all abrasives, acids and alkalis. It is applied with a lint-free rag and wiped on the surface in the same manner as when the metal is washed down with lacquer thinner. The wiping operation should preferably be in a forward and aft direction. Molyclad, definitely not a paint material, is not recommended for spray purposes. Inasmuch as it contains lacquer-type solvents, it should be used accordingly over and around insignia, markings and numerals.

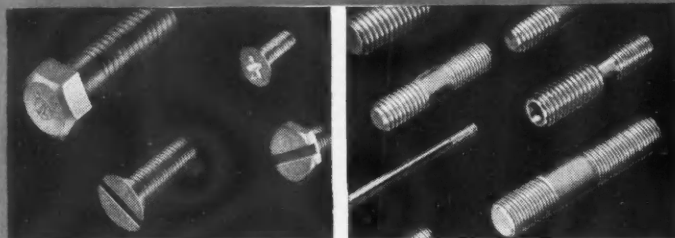
SPECIALTY FASTENERS

to fit unusual fastening jobs

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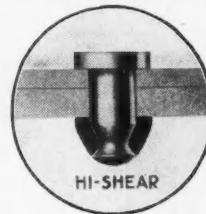
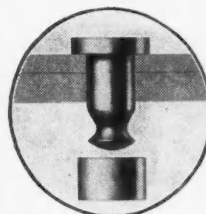


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"HI-SHEAR"* RIVETS** reduce weight, increase shear strength. "Hi-Shear" Rivets have a shear strength of 75,000 p.s.i. When used to replace bolts and nuts, they reduce weight and are easier to install. The "Hi-Shear" Rivet consists of a specially formed heat-treated alloy steel pin, headed at one end and grooved at the other. An aluminum collar fits the grooved end and forms a high button head when deformed by a riveting tool. To remove, simply destroy the collar and push out the rivet.



Write for descriptive booklet on any of these specialty fasteners. Please specify which ones interest you.

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(**Pat. Applied For.)

THE NATIONAL SCREW & MFG. COMPANY, CLEVELAND 4, OHIO

AUTOMOTIVE INDUSTRIES, November 1, 1948

Reduction of Automobile Excise Tax Unlikely Next Year

By George H. Baker

Washington Bureau,
AUTOMOTIVE INDUSTRIES

The prospects of excise tax reduction next year for the automobile industry are not very bright. The 81st Congress, when it convenes in Washington next January, will undoubtedly take up the all-important task of making cuts in excises now applying to certain selected commodities and services.

However, a general revision of excise taxes just isn't in the cards at this time. And proposals for tax reduction or elimination on such products as automobiles, automotive parts and accessories, and tires and tubes are not scheduled to get very far—based on present plans of majority leaders.

Generally speaking, Congress feels that the automobile industry is enjoying a period of relative prosperity which by present signs should continue indefinitely. It is claimed that sales of automobile products and related commodities are, with few exceptions, holding their own or are continuing upward climbs.

The entire problem of excise tax legislation for 1949, based on present plans of majority leaders, can be summed up this way: (1) Eliminate some taxes, (2) reduce others, and (3) broaden the base to make up for the lost revenue. The long-range view to support this program is this: Many legislators feel that the Federal Government has for some years been drifting into the error of relying too heavily on the revenue derived from income taxes. Until recently, excise taxes had never been an important source of revenue. They were applied in good times and taken off in poor times and always have resulted in floods of protests from both retailers and consumers.

The trend which now is gaining more and more favor both on Capitol Hill and in the executive branch of the Federal Government is that excise taxes should be increased in number and shifted to the manufacturing level. Here these taxes would become a permanent part of the nation's tax structure. And, over a period of years, excises would be applied to more and more products and commodities, so that eventually an excise tax would be levied on almost every article produced in the United States. An old adage among congressmen serving on the two revenue committees of Congress is that collecting taxes is like plucking a goose—"you want to get the most feathers with the fewest squawks."

As every businessman realizes, the problem of tax reduction is directly related to the problem of reduced Federal expenditures. Taxes cannot be cut until the cost of running the Federal Government can be cut.

If business continues to be good and incomes remain high, the Treasury De-

partment will reap a large return from income taxes and the so-called luxury taxes. But, if the level of business activity takes an unexpected drop, most or all of the excises now in effect may have to be retained for the revenue they will bring in to the Federal coffers.

Congressional leaders believe that if all or most of the excise taxes are ultimately levied and collected at the manufacturing level, the consumer will not squawk too loudly. Taxes would be paid by the manufacturers and the feeling on Capitol Hill is that most consumers would be unaware that the selling price of an article includes a "hidden" levy tacked on at the manufacturing level.

A further argument for broadening the base of the Federal tax structure to include permanent manufacturers' excise taxes as well as income taxes is that the job of balancing the budget would become simpler. The national revenue, it is argued, would over a period of years tend to become less sensitive to the ups and downs in total amounts of revenue collected under the present tax structure which is based principally on the income tax.

Proponents of the manufacturers' tax say that consumers always buy each year a certain minimum of goods and services. People will naturally buy less in bad times than in good years, but certain cost-of-living items like clothing, furniture and certain household appliances are always in demand. A more or less steady and constant flow of revenue into the Federal treasury should therefore aid in achieving greater national financial stability and should make the balancing of the national budget an easier and more predictable task.

Both Representative Knutson, Republican, of Minnesota, chairman of the House Ways and Means Committee, and Senator Millikin, Republican, of Colorado, chairman of the Senate Finance Committee, agree that the next tax relief to be granted by Congress will be in the field of excise taxes. But they warn that any cuts will be small, and that cuts will be made only if the budget for fiscal 1950 will permit reductions. And they insist that any forthcoming reductions will be selective in nature, and will not be in the nature of general excise reductions.

It appears almost certain that the chief source of the Federal Government's annual \$7,500,000,000 revenue from excise taxes will be retained—at least for the foreseeable future. Therefore, little or no tax relief can be predicted for such products as liquor,

tobacco, automobiles and automotive parts, gasoline, firearms, refrigerators, radios, and the like.

In other fields, some tax relief seems more likely for 1949. For such commodities as jewelry, furs, toilet preparations, luggage, handbags, and wallets there may be exemptions granted for the lower-priced articles. Excises on transportation, business machines, telephone, telegraph and wire services may be next in line for reduction.

Tax officials estimate that the Federal Government now derives about \$100,000,000 annually from excises on jewelry. Another \$50,000,000 is collected annually from sales of toilet preparations, and about the same amount is collected in revenues assessed against luggage and leather goods sales. Therefore, Congress will weigh this prospective loss of revenue carefully before voting even modest reductions in excises. It is up to businessmen to point out to Congress that lower taxes generally encourage investment, capital expansion, and raise the level of business activity.

Chairman Knutson summarizes the tax outlook in this way: "Our Federal internal revenue system must be based on a well-balanced tax system. It should not be confined to the income tax, or to the income tax and excise taxes on liquor, tobacco, and beer alone. To do so will seriously cripple the Federal revenues and throw the entire burden of supporting the activities of the Federal Government upon a few, chiefly those paying the income tax. The income tax does not reach the man living on his capital or the man deriving his income from tax-exempt securities.

"Furthermore, the income tax is one of our most unstable sources of revenue. In times of active business, when capital is gainfully employed and profits are large, the Government collects large revenue from the income tax. When industry and commerce slow down, capital ceases to work, profits disappear, and the income of many individuals vanishes as well as our taxes.

"This is why the income tax fails to produce revenue in periods of decline, as is shown by the experience in 1932 when we had to impose additional excise taxes to head off a deficit because the revenue from the income tax had declined to such an extent that it was insufficient to meet the costs of government.

"To depend too much upon such a tax will place an intolerable burden upon the active American businessman, the man with a salary, and the successful professional man, thus preventing business expansion and production as well as individual incentive."

New and Improved VICKERS PRODUCTS

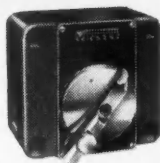
For Better Hydraulic Machinery

The Vickers units illustrated below are either new products or have recently been improved. Among their advantages are small size, and many have gasket mounting for even more compact hydraulic installations. For information regarding any of these new or improved units, ask for the Data Sheet or Bulletin number indicated.



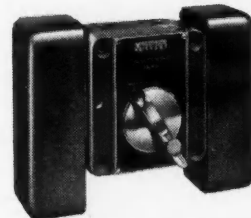
VICKERS CHECK VALVE
(In-Line Type)

For working pressures up to 3000 psi, this compact check valve can be furnished for piping sizes 1/4", 3/4" and 1 1/2". Data Sheet 113720.



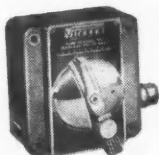
VICKERS FLOW CONTROL VALVE

Accurate control of oil flow in hydraulic systems (independent of pressure variation) can be obtained with this compact, gasket mounted unit. Bulletin 45-35.



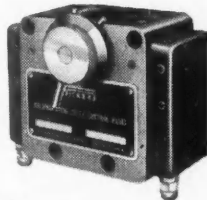
VICKERS CYCLE CONTROL PANEL
(Solenoid Operated)

A compact unit for controlling rapid traverse and adjustable feed cycles with fully remote electrical cycle timing. Data Sheet 109164.



VICKERS FLOW CONTROL AND OVERLOAD RELIEF VALVE

Compact metering valve incorporates the Vickers patented flow control and relief valve for regulation of oil flow and pressure. Bulletin 48-36.



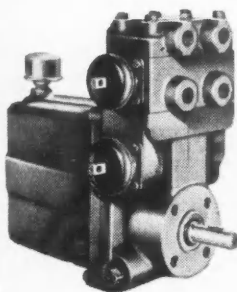
VICKERS RECIPROCATING CYCLE PANEL

For reciprocating cycles of machine tool carriages, etc., with accurate and selective reversal control. Data Sheet 80803.



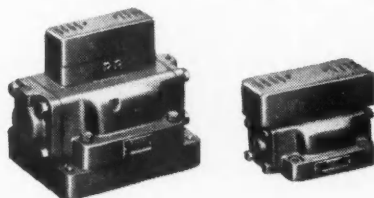
VICKERS PRESSURE SWITCH

Available in two models for pressure ranges 100-2000 and 500-3500 psi with independent pressure differential adjustment. Data Sheet 113929.



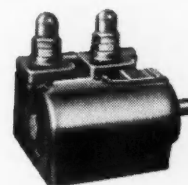
VICKERS POWER PACK

Vane type hydraulic pump, overload relief valve, oil tank, filter and operating valve are included in this low priced unit. Bulletin 46-48a.



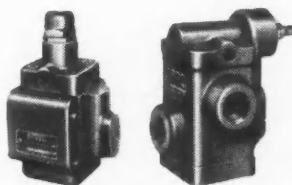
VICKERS SOLENOID OPERATED CONTROL VALVES

Compactness, simplified installation and minimum piping are but a few of many features. Bulletin 48-27.



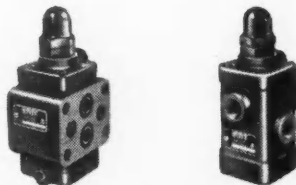
VICKERS TWO PRESSURE PUMP
(Small)

Two vane type pumps and integral automatic valving, all combined in this compact unit, providing high-low pressure pumping action. Data Sheet 117994.



VICKERS PRESSURE REDUCING VALVES

Maintain accurate reduced pressure; available with integral free return flow check valve, gasket and screw connections. Data Sheets 101885, 100165.



VICKERS PRESSURE SEQUENCE CONTROL VALVES

These new sequence valves are available for smaller piping sizes, and are arranged either for gasket mounting or threaded connections. Bulletin 45-34a.



VICKERS PROPORTIONAL OIL FILTER

This compact filter provides continuous micron filtering for hydraulic systems at pressures up to 3000 psi. Bulletin 47-50.

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PUBLICATIONS AVAILABLE

Publications listed in this department are obtainable by subscribers through the Editorial Department of AUTOMOTIVE INDUSTRIES. In making requests please be sure to give the NUMBER of the item concerning the publication desired, your name and address, company connection and title.

L-113—Lathes

South Bend Lathe Works—A new catalog, prepared for those engaged in motor service, is available. It is Catalog 12-D and in it are illustrated, described and priced all sizes of South Bend lathes, drill presses, benches, etc. Also included is a complete line of chucks, tools and accessories.

L-114—Temperature Control

Leeds & Northrup Co.—A newly-revised 38-page catalog presents the latest developments in the company's Duration-Adjusting Type electric control for regulating temperature of electric furnaces, salt pots and certain fuel-fired furnaces. The catalog is illustrated with pictures of actual installations. In addition to listing the Micromax instruments, the Speedomax line of controllers, for applications where speed and sensitivity are required, is also included.

L-115—First Aid in War on Corrosion

The International Nickel Co., Inc.—A new Standard Specialties catalog contains a complete compilation of products made of Monel, Nickel or Inconel.

Among the hundreds of Standard Specialties described and illustrated under 47 general classifications are balls, floats, nails, bolts, pickling slings and hooks, thermostat parts, thermocouple protection tubes, pipe and pipe fittings, etc.

L-116—Bandsawing Machines

The DoAll Co.—Contour Sawing Hard Metals & Vitreous Materials with Newly Developed Diamond Band Sawing Machine is the title of a four-page illustrated technical report by the DoAll Technical Institute. Photographs and text describe how materials like glass, porcelain, granite and hardened metals can be cut directly to layout lines by using new Diamond Bandsawing Machines. Information covers the design of the diamond-studded band saw, the sawing machine and its accessories.

L-117—Drills

Chicago-Latrobe Co.—An attractive new 225-page Chicago-Latrobe Twist Drill Works' catalog contains information on the company's tools and gives the new tool dimensions; technical and helpful facts on drills and reamers illustrated with diagrams. The catalog has two convenient general indexes for

alphabetical and numerical aid in locating items easily. Requests for the catalog should be made on your company letterhead directly to Chicago-Latrobe Twist Drill Works, 411 W. Ontario Street, Chicago 10, Ill.

L-118—Spray Booths

Schmieg Industries—Catalog No. 480 describes the Schmieg Centri-Merge Spray Booths for the elimination of paint overspray. Photographs and blueprint reproductions of typical plant installations are given. Catalog No. 481 offers comprehensive information concerning equipment made by the company, including dust and fume control units, spray booths, mechanical washers, industrial ovens and sheet metal equipment and accessories. Tables of technical information for plant managers and engineers are included.

L-119—Automatic Arc and Gas Welding Processes

American Welding Society—A new booklet, giving the survey of automatic arc and gas welding processes as used in the automotive industry, represents a compilation of information from users of these processes, including submerged arc, atomic hydrogen, carbon-arc, etc. Copies may be had from the Society at 33 West 39th Street, New York 18, N. Y., at thirty cents each.

L-120—Shapers, Lathes

Sheldon Machine Co., Inc.—Catalog G-48 describes, illustrates and gives details of shapers and lathes. (Turn to page 58, please)

TIME SAVER COUPON for your convenience in obtaining, *WITHOUT OBLIGATION*, more information on any one or more of the publications described above OR New Production and Plant Equipment OR New Products items described on other pages.

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tailed specifications of the new post-war machine tools, accessories and attachments made by the company. The catalog is so arranged that illustrations, descriptions and specifications are in every instance on the same or facing pages. 52 types and models of lathes, shapers and milling machines are covered as well as many accessories and attachments, which are arranged alphabetically for quick reference.

L-121—Crank Shapers

General Engineering & Mfg. Co.—A new 24-page catalog in color contains illustrations and complete description of the GEMCO line of multi-purpose crank shapers. Each feature of engineering—tool head, ram, crossrail, column, base, transmission, rocket arm, etc.—is treated separately by illustration and description. A table of complete specifications on each shaper, plain, production and universal models, is a feature of the catalog.

L-122—Protective Coatings

Koppers Co., Inc., Tar Products Div.—A new 12-page folder gives direction on the application of cold-applied protective coatings, especially designed to prevent corrosion and deterioration. Information includes description of protective coatings, general information on surface preparation, coating thickness and methods of application. Pictures of specific applications; methods of preventing corrosion, etc. are presented.

L-123—Machine Tools

National Machine Tool Builders Assoc.—A new booklet entitled *The World's Best Investment*, furnishes specific formulas which companies in various industries have used in connection with machine tool replacement programs. It is directed to financial and management executives in manufacturing corporations.

L-124—Lathe Turrets

Enco Manufacturing Co.—A new 16-page catalog, No. 48, contains pictorial illustrations showing many typical applications of turrets on actual jobs. The new model Enco Carriage Hex turret is shown. Selections for particular lathes are simplified by selection charts showing lathe manufacturers' recommendations.

L-125—Vibration Control

Korfund Co., Inc.—The advantages and limitations of spring mountings, rubber mountings and cork material in the control of vibration, together with data on their installation and uses are given in a new bulletin, G-101. A

Selector Chart tabulates more than 50 typical machine and equipment applications and gives recommendations for proper types of vibro-isolators for highest efficiency. Typical specifications have also been written for incorporation in installation contracts.

L-126—Tube Valves

Grove Regulator Co.—A new 16-page bulletin, No. 800-B, describes the varied manual and automatic remote control applications of Flexflo expandable tube

valves. Included in the bulletin is technical data and diagrams of typical arrangements suitable for stop valve; emerging shut-off and release valve; liquid level control, etc.

L-127—Check Valves

Grove Regulator Co.—Bulletin No. 610-B describes the operation and performance of Chex-Flo Check Valves of the expandable tube type, which are employed on air, gas, oil or water at temperatures not exceeding 150° F.

PERSONALS

Recent Personnel Changes and Appointments at the Plants of the Automotive and Aviation Manufacturers and Their Suppliers.

Chrysler Corp., Chrysler Div.—Joseph A. O'Malley has been made General Sales Manager, succeeding Stewart W. Munroe, who has resigned to enter private business. Roy H. Appleman has been promoted to Asst. General Sales Manager to fill the vacancy created by Mr. O'Malley's change of position.

General Motors Corp., Chevrolet Motor Div.—The appointment of L. N. Mays as Sales Promotion Manager of the Division has been announced.

Studebaker Corp.—Carrol W. Evans has been appointed General Supt.

Bendix Products Div.—George W. Pontius has been appointed Manager of Automotive Engineering.

Keller Motors Corp.—W. Gordon Gerrard has been made Sales Manager.

Curtiss-Wright Corp., L. G. S. Spring Clutch Div.—Charles M. Richart has been named Personnel Manager. Mr. Richart succeeds R. R. Everroad who has been made Asst. Industrial Relations Manager of Wright Aeronautical Corp.

Republic Aviation Corp.—Robert R. Miller has been appointed Asst. to the President, M. I. Peale.

Luscombe Airplane Corp.—Horace M. Hoffman, Production Manager, has been elected to the corporation's Board of Directors.

Pratt & Whitney—Thomas L. Jenner has been transferred to the Chicago office where he will be associated with machine tool sales.

General Electric Co.—C. I. MacGuffie and R. C. Freeman have been appointed Manager of Sales and Manager of Engineering, respectively, of the company's Welding Divisions. A. F. Vinson has been made Manager of the Welding Divisions.

Chambersburg Engineering Co.—R.

E. W. Harrison, Vice-President, has resigned to enter private business.

Perfect Circle Corp.—Rufus Austin has been transferred to the Corporation's Detroit office where he will supervise both the Detroit and Chicago offices, as well as the east coast manufacturing accounts.

Walker Manufacturing Co.—The appointment of Floyd Lucas as Supt. of the company's main plant in Racine, has been announced.

Twin Disc Clutch Co.—John H. Batten is the newly elected President of the company. P. H. Batten, founder of the company, is Chairman of the Board of Directors.

Eaton Mfg. Co.—William D. Moss has been made Traffic Manager, with headquarters in Cleveland.

A. Schrader's Son Div., Scovill Mfg. Co., Inc.—Thomas W. Hall has been appointed Manager of the Toronto Branch, succeeding the late Allan Rae. George A. Warlow has been made Canadian Sales Manager.

American Smelting and Refining Co., Federated Metals Div.—A. M. Callis has been appointed to the newly created post of General Sales Manager.

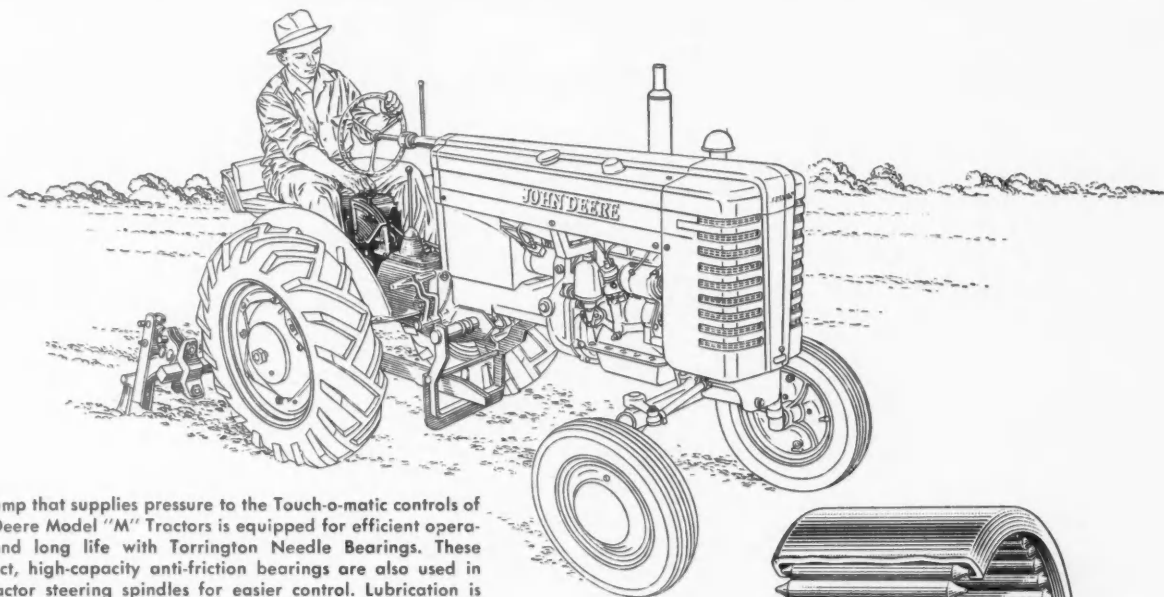
The Willard Storage Battery Co.—George W. Wolff has been promoted to the position of Asst. Sales Manager. A. L. Blackwell succeeds Mr. Wolff as National Service Manager.

Mack Trucks, Inc.—Charles J. Moran has been transferred to the Sales Dept. and will locate at the company's Pacific Coast headquarters in Los Angeles. Theo. J. Zeller becomes Plant Manager at Allentown.

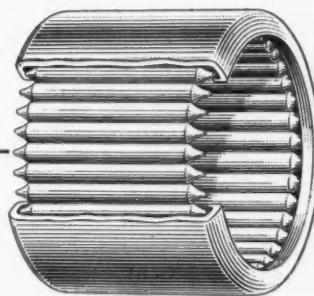
The Autocar Co.—Charles D. Allen has been appointed District Manager of the Boston branch. W. J. Savoye succeeds Mr. Allen in New Haven.

(Turn to page 70, please)

Putting on the Pressure with Torrington Needle Bearings



The pump that supplies pressure to the Touch-o-matic controls of John Deere Model "M" Tractors is equipped for efficient operation and long life with Torrington Needle Bearings. These compact, high-capacity anti-friction bearings are also used in the tractor steering spindles for easier control. Lubrication is required only at general overhaul periods.



... high unit capacity secured in compact design of hydraulic pump with efficient Needle Bearings.

Touch-o-matic hydraulic controls, that raise, lower and set the depth of implements attached to the new John Deere Model "M" Tractors, operate at a relief pressure of 740-760 psi. To put on such pressure with a small, compact pump, Deere engineers specified Torrington Needle Bearings for their tremendous unit capacity and small size.

Needle Bearings occupy less space, load for load, than any other anti-friction bearing. With high radial capacity and low friction coefficient, these efficient units reduce wear, assure that

pump gears will continue to mesh accurately, preventing back-flow and waste of power. Long, satisfactory service life is secured with minimum maintenance attention.

To gain the advantages of compact, lightweight, high-capacity Needle Bearings in equipment you build, design or use, enlist the specialized skills of Torrington's engineers. Call or write the nearest Torrington office.

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Torrington, Conn. • South Bend 21, Ind.

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TORRINGTON *NEEDLE* BEARINGS

NEEDLE • SPHERICAL ROLLER • STRAIGHT ROLLER • TAPERED ROLLER • BALL • NEEDLE ROLLERS

AUTOMOTIVE INDUSTRIES, November 1, 1948

NEWS of the AUTOMOTIVE INDUSTRIES

(Continued from page 23)

Treaty Proposes Easing of Foreign Licensing

Further details on provisions of an international automotive treaty, which is to be submitted by the State Dept. to the United Nations, have been revealed by AAA. An important feature is that motorists from signatory nations would be able to drive cars into other countries covered by the pact without the necessity of obtaining license plates and driving permits.

Cyril Bath Co. Purchases Roto Stretcher Patents

The Goodyear Aircraft Corp. has sold its patents, machine designs, and claims covering the "roto stretching" process in the United States, Canada, and England to the Cyril Bath Co. During the war both companies developed machinery and methods for forming automobile, aircraft parts and other items under the process.

McCord Stockholders To Vote on Increase

A plan to increase the number of authorized shares of McCord Corp. common stock will be submitted for approval at a stockholders' meeting Dec. 1. Directors of the company have recommended that the common stock be increased from the 227,823 shares currently authorized to 400,000 shares. Stockholders will also vote on approving a par value of \$50 for preferred stock and \$3 for common stock.

In recognition of his 42 years association with the U. S. Post Office, and long service in the best interests of American business and direct mail advertising, Nelson B. Wentzel, Deputy Third Assistant Postmaster General, is shown at the right, being presented with a bronze plaque, in Philadelphia recently, by Edward N. Mayer, Jr., at the left, president, James H. Gray, Inc., and a former president of the Direct Mail Advertising Association.



Timken Report Shows Lower Net on Sales

The financial report of the Timken-Detroit Axle Co. for the fiscal year ending June 30 reflects the problem the automotive industries are facing in relation to ratio of profit to net sales. During the year total sales were nearly \$11.5 million, the largest for any peacetime year in Timken's history. Dividends, however, were less than in 1941 or 1942 because of a lower percentage of profit to sales, and also because larger working capital requirements necessitated retaining more money in the business. Currently, Timken has a \$2.5 million expansion program under way outside the Detroit area. It includes a new brake plant at Ashtabula, O., and a trailer axle plant at Kenton, O.

E. R. Breech In England On Productivity Council

E. R. Breech, executive vice-president of the Ford Motor Co., is currently in England as a member of the ECA Anglo-American council on productivity. The council is composed of eight British and American industrialists and eight labor leaders representing both countries.

Henderson Not Anderson Joins E. W. Bliss

W. F. B. Henderson has joined the executive staff of E. W. Bliss Co. as executive vice president and member of the board. An item in the Oct. 1 issue of AUTOMOTIVE INDUSTRIES on page 56 incorrectly referred to Mr. Henderson as W. F. B. Anderson. Mr. Henderson was formerly executive vice president and director of The Clearing Machine Corp. and had previously been associated with Briggs, Maxwell Motors, and Budd Mfg. Co.

Packard Postpones Plan To Reduce Stock Shares

A plan to reduce the number of outstanding shares of Packard Motor Car Co. stock has been postponed indefinitely, according to George T. Christopher, president and general manager. There are currently 15 million shares of Packard stock outstanding. Mr. Christopher said that if future conditions present a more opportune time for considering the matter, stockholders will be kept fully informed. Packard has also announced a dividend of 20 cents a share payable Oct. 18 to stockholders of record Sept. 18. A 15 cent dividend was paid March 29 of this year.

Ted Horn

Ted Horn, 38, famed automobile racing driver, died in DuQuoin, Ill., on Oct. 10.

NEW TRUCK REGISTRATIONS*

Arranged by Makes in Descending Order According to the Eight Months' 1948 Totals.

MAKE	EIGHT MONTHS							
					Units		Per Cent of Total	
	August 1948	July 1948	August 1947	July 1947	1948	1947	1948	1947
Chevrolet	25,891	25,540	18,931	18,931	205,717	137,534	28.56	23.69
Ford	20,826	22,935	18,342	18,342	162,613	138,919	22.57	23.93
International	10,593	11,830	10,553	10,553	92,689	74,624	12.86	12.85
Dodge	10,184	8,558	10,851	10,851	76,928	87,043	10.68	14.99
G. M. C.	6,852	6,181	2,185	2,185	47,555	33,164	6.60	5.71
Willys Jeep	5,238	4,940	5,298	5,298	35,426	31,087	4.92	5.35
Studebaker	4,644	5,286	3,652	3,652	33,464	27,632	4.64	4.76
Willys Truck	2,386	3,027			18,331		2.54	
Reo	949	1,012	829	829	8,246	9,021	1.14	1.55
White	876	910	1,016	1,016	8,175	8,682	1.13	1.50
Diamond T	1,018	1,058	905	905	7,649	6,849	1.06	1.18
Mack	796	848	1,104	1,104	7,170	6,936	1.00	1.19
Divco	446	420	293	293	4,109	3,061	.57	.53
Federal	281	334	520	520	3,221	3,818	.45	.66
Brockway	196	201	358	358	2,077	2,885	.29	.50
Autocar	204	227	289	289	1,888	3,091	.26	.53
Crosley	209	203			1,830		.25	
F. W. D.	44	175	59	59	650	792	.09	.14
Sterling	39	38	41	41	323	405	.04	.07
Kenworth	43	38			286		.04	
Ward La France	8	11	40	40	228	371	.03	.06
Oshkosh	2	3	14	14	134	164	.02	.03
Hudson		2	220	220	112	2,197	.02	.38
Nash	1	2			16			
All Others	197	257	412	412	1,639	2,364	.24	.40
Total	91,923	94,036	75,912	75,912	720,476	580,639	100.00	100.00

* Data from R. L. Polk & Co.

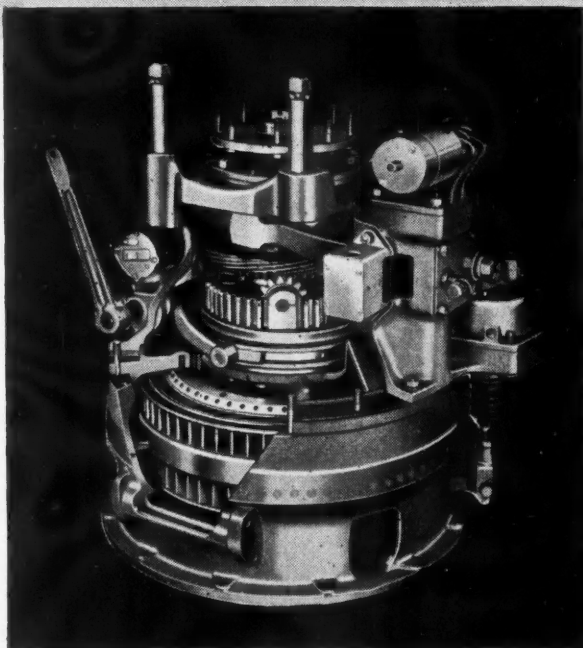


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exemplified to the highest
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transmission in
the Spicer Torque Converter

SPICER MANUFACTURING

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PARISH FRAMES • STAMPINGS • TORQUE CONVERTERS • UNIVERSAL JOINTS
SPICER "BROWN LIPE" GEAR BOXES • RAILWAY GENERATOR DRIVES

New 1949 Nash Models

(Continued from page 29)

As mentioned earlier, the front suspension is of the same general type on both models, except for a new front wheel spindle assembly on the Ambassador. This provides a greater span between upper and lower kingpin bearings and saves about 11 lb of weight in forgings.

With the new suspension a track bar is used at the rear on both series to control axle-to-body relationship. Only the Ambassador mounts a front sway

bar. Dust tubes have been removed from shock absorbers on both models, the change having the effect of reducing operating temperatures and the tendency to amplify road noise.

The clutch hook-up on both models is the same as adopted recently on the "600." The transmission and overdrive set-up is continued as before, except for a new Warner Gear transmission on the Ambassador. To maintain the same propeller shaft lengths and to

simplify the installation of overdrive, the rear housings of conventional transmissions are made sufficiently longer to compensate for the added length of the overdrive unit.

Some weight saving has been effected by utilizing aluminum in certain instances. For example, aluminum is employed for the die cast inlet manifold cover on the Ambassador. An aluminum clutch housing for the "600" accounts for a saving of 12½ lb. Water pump housings for both models also are of aluminum.

Returning to body details, a one-piece windshield of unique design, fitted with curved glass permits moving the front pillars back for better vision. The windshield is installed from the outside and water tightness is said to be easier to maintain. Wiper blades are of a new type with greater flexibility for cleaning curved surfaces. The windshield wiper motor is located inside the Weather-Eye heat distributing cover, and uses steel cables running over pulleys to provide power connection to the two wiper heads.

Extensive changes have been made in the design of the Weather-Eye to improve heating effectiveness at low car speeds to provide better distribution of warm air in the passenger compartments and to produce a more effective water shedder. In this arrangement a pressurizing fan has been added below the heater core to circulate heated air at low car speeds or when the car is stopped.

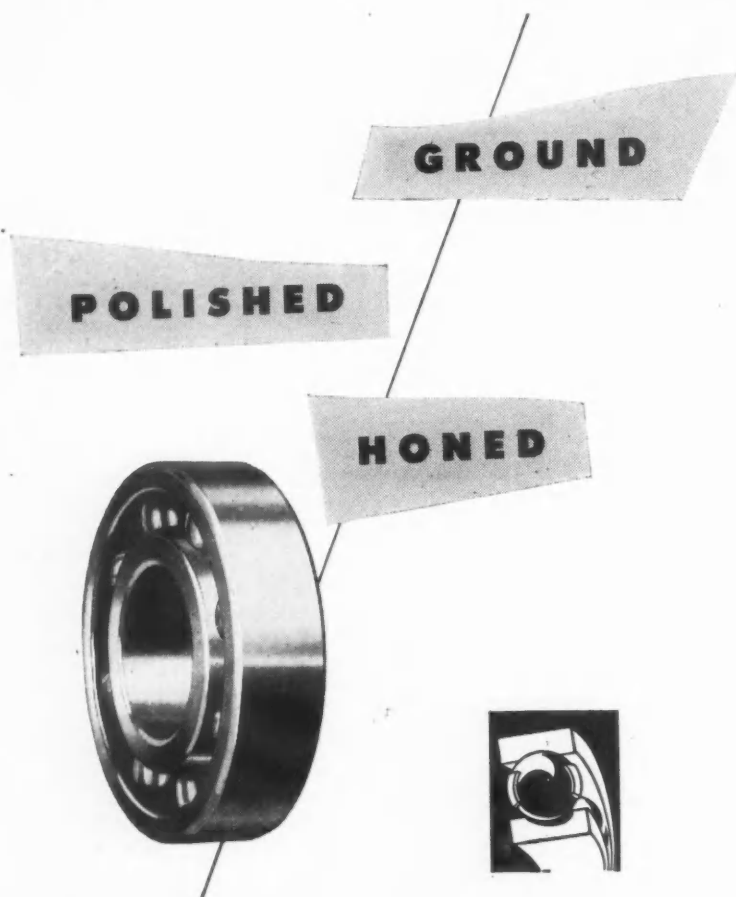
Structurally the new bodies are basically the same as the former "600", except for many details and revisions to accommodate the new styling motif.

Sleeping arrangements, long an exclusive Nash optional feature, have been greatly improved with the development of an entirely new bed. On the new models, both the front and rear cushions are used for making the bed, the front seat back cushion being arranged to swing downward for this purpose. It is said that the bed can be made up more easily while the trunk compartment is left undisturbed since the bed is formed entirely within the passenger compartment.

Body styles of both the Ambassador and the "600" series include the four-door sedan, two-door sedan and the Brougham. The 1949 Brougham features a novel rear seating layout with two wide single seats angled slightly to face toward the center and separated by a triangular "super-sized" arm rest.

C. E. Wilson to Address Parts Makers

C. E. Wilson, president of GM, will be principal speaker at the annual meeting of the Automotive & Aviation Manufacturers Association in Detroit, Nov. 4. A closed business session for association members will precede the evening dinner meeting at which Mr. Wilson will talk.



Only HOOVER does all three

Modern machines are being constantly designed for faster operating speeds. These higher speeds demand bearings with raceways so smooth as to reduce friction to a minimum. Grinding and polishing of ball bearing raceways is no longer sufficient. To provide the mirror-smooth surface necessary at high speeds, Hoover has developed a method of honing the raceways by production line methods. That is why manufacturers, everywhere, are finding that Hoover Ball Bearings have 30% longer life . . . 30% greater load carrying capacity . . . and a smoothness and quietness heretofore unheard of.

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OF BEARINGS



Hoover

America's only Ball Bearing
with HONED RACEWAYS

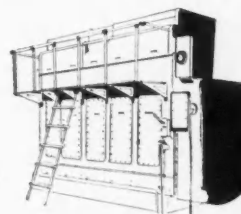
HOOVER BALL AND BEARING CO. ANN ARBOR, MICH.



You'll find unusual combinations of physical properties to meet your needs for improved product performance and appearance in Continental-Diamond high-strength plastics. Take *Celoron*, for instance, used in the gear shown here. This versatile material provides strength, resiliency, light weight, as well as moisture, heat, and corrosion resistance. Moreover, it is readily workable . . . can be tapped, drilled, shaped, milled, and threaded with ease.

And *Celoron* is but one of many C-D materials that can help to add new advantages to your product. Whatever your application, see Continental-Diamond first for recommendations that lead to higher product quality and appearance . . . lower fabrication costs. Your nearest C-D office has trained technicians with additional information that will interest you. Call or write, any time.

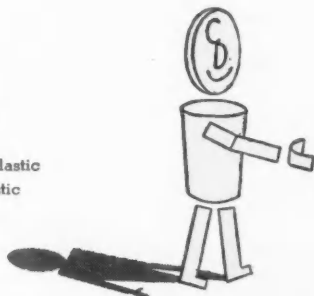
What New Advantages Can You Add to Your Product?



Another C-D Case of Improved Performance

Making a huge, 2-foot timing gear for Diesel Locomotives always presents problems. The gear had to be strong enough to stand terrific strains—yet resilient enough to absorb shock. Dimensional stability, quiet performance, and easy machining were basic requirements. *Celoron* is proving its ability on applications like this, and a host of others where mechanical precision and rugged operation are needed.

DIAMOND FIBRE—Vulcanized Fibre
VULCOID—Resin Impregnated Fibre
DILECTO—Laminated Thermosetting Plastic
CELORON—Molded High-Strength Plastic
MICABOND—Bonded Mica Splittings



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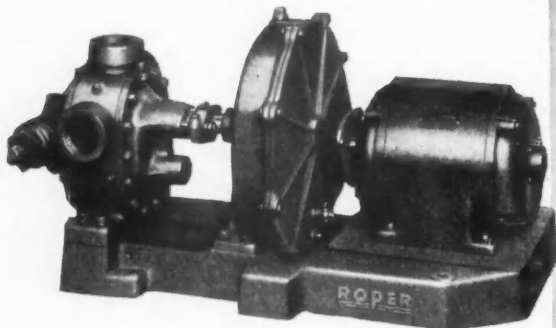
Continental - Diamond FIBRE COMPANY

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RUGGED- THESE ROPERS ...and Dependable!

PUMPS ENGINEERED TO FIT YOUR NEEDS

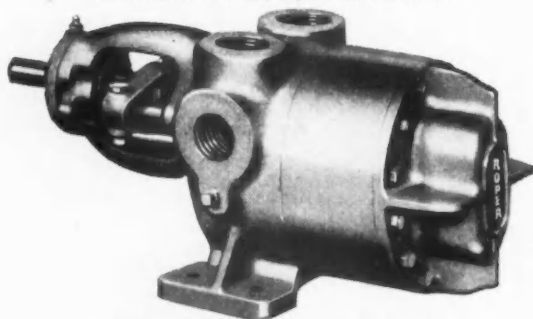
Roper manufactures an extensive line of precision-built pumps to serve a multitude of applications in bulk stations, tank trucks, tanker terminals, refineries, and industrial plants. Illustrated are three examples of pumps in Roper series 3600, K, and F — each representative of varying pressure and capacity ranges.



FOR PRESSURES TO 60 LBS. P.S.I.
CAPACITIES FROM 40 TO 200 G.P.M.



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Illustrating and describing pumps built to handle pressures up to 1000 lbs. p.s.i., capacities 3/4 to 300 g.p.m., at speeds up to 1800 r.p.m.

ROPER

Rotary Pumps

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Swiss Process for Heat Treating Cr-Si Valves

The metallurgical laboratories at Sulzer Brothers Ltd., Switzerland, in a series of heat-treatment experiments with a chromium-silicon valve steel, have worked out a special mode of heat treatment which is reported to produce a valve stem structure of fine grain and high tenacity. The experiments were prompted by the examination of a number of valve stems of chromium-silicon steel which, after being treated as prescribed by the suppliers, showed a strikingly low tenacity and a very coarse grain structure.

The metal used for the experiments was a Cr-Si steel of the following composition: 0.48 per cent carbon; 3.07 per cent silicon; 9.13 per cent chromium; usual contents of manganese, phosphorus and sulphur. To determine the most suitable hardening temperature, small notched test-pieces were quenched in water at a series of different temperatures and then tested as to hardness and structure at the surface of fracture. This procedure permitted the most favorable range for the hardening of a steel to be determined in a very simple manner, the temperature at which overheating began being very sensitively indicated in the structure.

These tests showed that the range of temperature from 1000 to 1030 C was the most favorable for hardening. Also, it was found that a second tempering treatment was needed to give a uniform troostitic grain structure to the steel.

A test piece heat-treated in accordance with the indications of the hardness test (1030 C/30 min/water plus 800 C/3 hr/air) gave the following strength figures:

Brinell hardness	300 kg per sq mm
Rockwell hardness, Rc...	30
Yield point	99,000 psi
Tensile strength	151,200 psi
Elongation (length = 5 x diam)....	16.0 per cent*

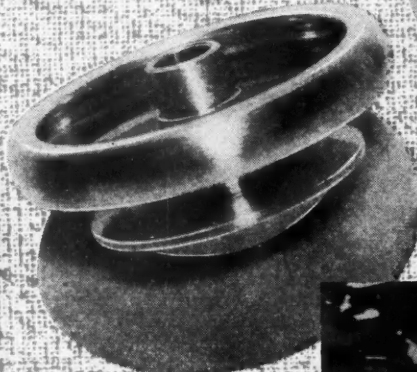
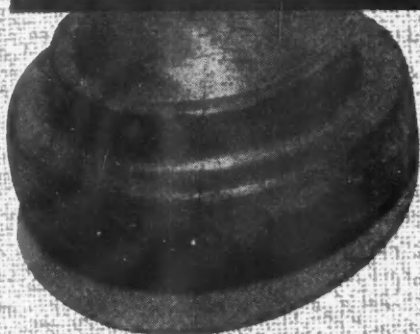
* Fracture near the head of the bar.

The results of the metallographic investigations, extended to include micro-hardness tests, showed that the hardenability of the steel increases with rising temperature as a result of the increasing dissolution of the special carbides in the γ -iron. For the same reason the steel inclines to overhardening at high temperatures with sudden quenching, and soft residual austenite then appears in increasing quantities together with martensite in the structure. Overhardening can be counteracted by the employment of mild quenching media.

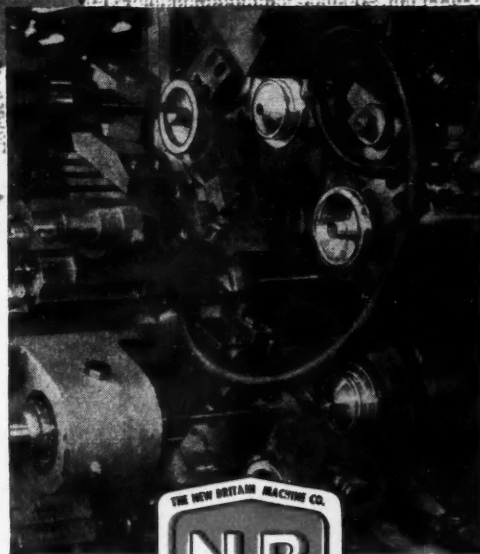
In the tempering process the martensite of the hardening structure decomposes and becomes troostite while eliminating the carbon held in forced solution. The residual austenite only changes to martensite during the subsequent cooling, after a preliminary impoverishment of carbon. A second tempering permits the martensite produced from the residual austenite to be transformed in its turn into tempering troostite.

Completely finished

**in 21 operations* on 1
NEW BRITAIN CHUCKER**



*Illustrated at right,
close up of 4, 5, 6,
7 and 8 positions.*



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Automatics

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NEW BRITAIN-GRIDLEY MACHINE DIVISION
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THIS aluminum balance wheel is converted from rough casting to completed part at the rate of 150 an hour. By finding better methods such as this, the manufacturer succeeds in holding profit margins while keeping the price of one of the best-known sewing machines in line.

Twenty-one operations are performed on a double index New Britain Model 98 Chucker. The result is an excellent finish, and the maintenance of a $\pm .002$ tolerance on the shaft hub O. D. and top of the belt groove.

When a single machine can perform a wide variety of accurate cuts, eliminate all second operations and turn out finished pieces at a high rate . . . that's money-making production. You'll find it at its peak where fast, adaptable, accurate New Britain Automatic Screw Machines and Chuckers are at work.

For other specific examples, write for "It Can Be Done"—the portfolio of actual Cost Histories that is yours for the asking.

*For details write for Bulletin 98.

1148HGI

Smaller Tires and More Efficient Brakes for B-29

(Continued from page 41)

airplanes and having this background Bendix then turned its attention to the solution of the problem of the B-36. This project resulted in the design of special wheel and brake assemblies using 56 x 16 tires. In its present form the B-36 landing gear consists of two main struts each one mounting a truck which carries four wheel and tire assemblies with two wheels forward and two rear. The complete tricycle landing gear has 10 wheels. We are advised that this multiple wheel set-up is

lighter in weight than any of the previous arrangements, has greater load carrying capacity, takes less space in the wing cavity, and has a far more favorable factor of safety with regard to the hazard of tire blow-out.

The smaller-diameter, narrower brakes for these new wheels have greater capacity than do the larger sizes used experimentally. Above all, however, owing to the multiplicity of wheels the footprint loading and load distribution between wheels of this

enormous machine now approaches more closely the desirable range for military landing strips.

The heart of this striking advance is found in the development of the current type of wheel. Following airplane practice the wheel is sand-cast of magnesium and in its radical improvement Bendix drew on the specialized research facilities of the Dow Chemical Co. and American Magnesium Corp. Since the wheel section is narrower than conventional and the profile is considerably more slender, special attention was given to design form so as to achieve greater strength and rigidity. To accomplish this the engineering department carried on considerable stress analysis investigation leading ultimately to the desired structural form and distribution of sections and material.

Cooperating in this program Dow engineers contributed experimental work leading to the adoption of a special technique of shot peening on certain highly stressed areas of the wheel. In its present use shot peening has increased not only the structural strength but durability as well. Further work along this line is expected to result in the additional specification of burnishing of certain areas.


To illustrate the effectiveness of this new design Bendix engineers point out that while the maximum rating of the 65-in. wheel is 45,000 lb, this value is given as the minimum rating for the 56 x 16-in. Bendix wheel.

The improvement in brake capacity is quite exceptional. Without quoting the actual military rating in lb ft, it may be noted that the capacity of a single brake used in the Bendix 56 x 16 wheel is at least 24 per cent greater than the rating for the dual brakes used in the 65-in. wheel.

The swing to smaller wheels and tires is significant in many respects. In the first place the smaller sizes are considerably lighter and thus contribute in a big way to a reduction in deadweight. Moreover, the smaller equipment is better suited to the current types of military airplanes by permitting a more economical use of the space available in the narrower and thinner wing sections.

It is of interest to note in this connection that the trend to smaller wheels and tires has led to the adoption of tire inflation pressures of almost fantastic proportions. For example, whereas the 65-in. tire had a then unheard of pressure of 95 psi, the new 56 x 16-in. tire carries 175 psi. We understand that the still smaller tires now being developed for jet planes will have correspondingly higher inflation pressures.

Weight saving of importance has
(Turn to page 68, please)



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Finishing
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ARE MORE EASILY
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METAL PARTS WASHER

Whether the finishing operation is enameling, lacquering, machining, plating or inspecting, your washer must do a perfect cleaning job. The Blakeslee Metal Parts Washer is especially adaptable for cleaning between operations and prior to inspection . . . Continuous and batch type metal parts washers are familiar equipment throughout the automobile and aviation industries, as well as all other metal fabrication fields.



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JUST A FEW USES:

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Acadia Synthetic Products Division, Processors of Synthetic rubber and Plastics, sheets, extrusions and molded parts.

Felt's versatility suggests unlimited applications for design needs. Western Felt is available in any form—rolls, sheets, custom cut parts. Felt can be treated chemically to meet practically any requirement.

Western Felt, processed from wool-soft to rock-hard does not fray, ravel or lose its shape. It is cut to remarkably close tolerances and its uniformity is unsurpassed. Felt can be supplied to meet Army, Navy and S.A.E. specifications.

Why not check Western Felt's superior qualities and possible uses. Our engineers will gladly cooperate.

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LARGEST INDEPENDENT MANUFACTURERS AND CUTTERS OF WOOL, HAIR AND JUTE BELTS

(Continued from page 66)

been mentioned a number of times in the foregoing. Some idea of the potential weight saving may be gained by a comparison of the 65-in. and 56 x 16-in. casing and tube. The maximum allowable weight of the 65-in. casing is given as 400 lb; and the tube as 65 lb. For the 56 x 16-in. tire the casing weight is 268 lb maximum; and the tube 28 lb. Total weight of the 65-in. tire assembly, therefore, is 465 lb as compared with 296 lb for the 56 x 16-in. size. This is a saving of 169 lb per tire, or 36.4 per cent.

When weight saving of this order is

carried into the wheel and brake assembly and the supporting mechanism the overall economy of the new equipment becomes of great importance in reducing the deadweight of large bombers and the lighter jet propelled craft.

Bender Made Service Manager Of Studebaker Corp.

Roy B. Bender has been made general service manager of the Studebaker Corp. He succeeds D. O. Wilson who resigned after 36 years with the company, 24 of them as general service manager.

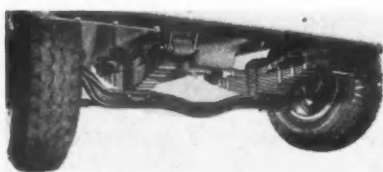


you find

TUTHILL SPRINGS

The subject, in this case, happens to be the rugged Thew-Lorain Moto-Crane carrier frame. It supports the tremendous loads of shovel and crane operation. But underneath all, supporting that frame, is a set of TUTHILL heavy-duty springs.

TUTHILL Springs were chosen because they are tough enough to stand up under the job. They are made of laboratory-tested alloy steel, heat-treated by special processes, to give that extra resilience and temper. You will find TUTHILL's wide variety ideally suited to your own springing needs.



A closeup view of TUTHILL's powerful leaf springs, supporting the front side of Thew-Lorain Moto-Crane.

Write for full information on the TUTHILL line

TUTHILL SPRING CO.

760 W. Polk Street, Chicago 7, Illinois

CALENDAR

Conventions and Meetings

Amer. Soc. Body Engineers, Annual Convention, Detroit	Nov. 3-5
SAE Fuels & Lubricants Mtg., Tulsa	Nov. 4-5
Amer. Soc. for Quality Control Conference, Chicago	Nov. 4-5
London Passenger Car Show	Oct. 27-Nov. 6
Society of Motor Mfrs. International Motor Exhibition, London	Oct. 28-Nov. 6
Westinghouse Materials Handling Conf., Buffalo	Nov. 8-9
Nat'l. Tool & Die Mfg. Assoc. Annual Mtg., Milwaukee	Nov. 14-17
Amer. Oil Chemists Soc. Convention, New York City	Nov. 15-18
Nat'l. Assoc. of Mfrs. Congress of American Industry, New York City	Dec. 1-3
Soc. for Experimental Stress Analysis—Annual Mtg., New York	Dec. 2-4
Amer. Inst. Electrical Engrs. Conf. on Arc Welding, Detroit	Dec. 6-8
Automotive Service Industries Show, Navy Pier, Chicago	Dec. 6-10
Nat'l. Assoc. of Eng. & Boat Mfg., Motor Boat Show, New York City	Jan. 7-15
SAE Annual Mtg., Detroit	Jan. 10-14
Nat'l. Materials Handling Expos., Phila.	Jan. 10-14
Nat'l. Auto Dealers Assoc. Convention & Equip. Exhibit, San Francisco	Jan. 24-27
Automotive Access. Mfrs. Annual Expos., New York City	Feb. 7-11
SAE Passenger Car, Body, Prod. Mfg., Detroit	Mar. 8-10
SAE Transportation Mtg., Cleveland	Mar. 28-30
SAE Aeronautic Mtg. New York City	April 11-13
Amer. Management Assoc. Nat'l. Packaging Exp., Atlantic City	May 10-13
Salon International DeL' Aeronautique, Paris	April 29-May 15
Middle Atlantic Regional Automotive Show, Phila.	May 23-30

BOOKS ...

ROTARY VALVE ENGINES, by Marcus C. Inman Hunter, published by John Wiley & Sons, Inc., New York. This book is devoted entirely to the rotary valve—the device that engineers and inventors have sought to make successfully for over 60 years. In this treatment, the author traces the history of the development of the rotary valve and illustrates the numerous applications of rotary and semi-rotary systems to both old and modern engines. At each stage in the design he shows how to combat friction, the chief danger to the success of the rotary valve.

Whether or not the rotary valve will ever completely replace other types of valves is a moot question. It is certain, however, that the rotary valve is a threat to the supremacy of the poppet valve used today on the majority of large and small internal combustion engines. It is entirely possible that in the future it may be used far more on high speed engines. Because of the increasing importance of this valve, the author's statement of the case for it is of more than average interest to engineers and engineering students.

IT'S TIME THOSE
STOCK CUTTING OPERATIONS
"OUT BACK" WERE BROUGHT
UP FRONT FOR
COST STUDY

MANY SAVE BY DOING IT THIS WAY

?
Do you cut...

BRONZE ROD
STAINLESS SHAPES
BRASS TUBING
MONEL
PHENOLIC PLASTICS
GLASS BOTTLES
TUNGSTEN WIRE
VALVE STEMS
RUBBER HOSE
PORCELAIN

IF SO, *Check*
AND CALL FOR AN

Allison
ABRASIVE
ACE CUTTING
EXPERT

THE ALLISON COMPANY
250 Island Brook Avenue
Bridgeport 8, Connecticut

THE RIGHT WHEEL FOR ANY MACHINE

Do you cut rod or bar stock for machining . . . tube for rings . . . shapes for unit parts? Have you had trouble cutting or slitting tough materials like tungsten, unannealed steel, plastics, glass, ceramics? If so, we repeat, it's time your cutting problems were studied for potential cost savings . . . in the light of specialized knowledge of abrasive cutting methods.

Abrasive cutting times are reckoned in SECONDS. Abrasive wheels . . . correctly selected for the job . . . cut to size within thousandths . . . leave a FINISHED surface with minimum burr . . . handle hardest materials easily.

Allison Abrasive Wheel Specialists study your problem specifically . . . bring you a wealth of cost and experience data . . . fit the wheel and the method to YOUR PARTICULAR JOB. Investigation costs nothing, simply write or call Allison.

Allison
ABRASIVE CUTTING WHEELS

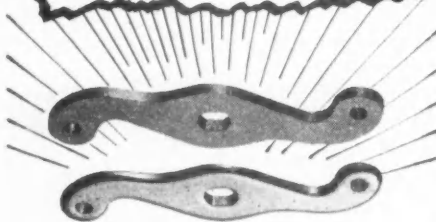


DOES CUT FINISHING COSTS

FISHING REEL MFR. REPORTS... (NAME ON FILE)

"The cost of finishing 11,000 crank plates by hand involves 268 hours at \$1.18 per hour for a total of \$316.00.

"The cost of finishing the same by Roto-Finish involves 138 hours at 30c per hour or a total of \$41.00. The net saving is \$275.00."



Unretouched illustration shows crank plate for fishing reel; above, before Roto-Finish deburring and finishing; below, after Roto-Finishing.

Such savings are possible in your finishing department, too! See how Roto-Finish produces a semi-lustrous surface uniformly on one or a thousand pieces; how it handles precision work. Send sample die castings, stampings, machined parts, forgings for processing. Include finished part for guide. No obligation! **THE STURGIS PRODUCTS CO., 872 Jacob Street, Sturgis, Michigan.**

FOREIGN LICENSEES:

Frederic B. Stevens of Canada Limited
Windsor, Canada
Roto-Finish Limited, London, England
A. Flavell Pty. Ltd., Melbourne, Australia

ROTO-FINISH
THE ENGINEERED
MECHANICAL FINISHING PROCESS

Personals

(Continued from page 58)

Fitzjohn Coach Co.—**Ben H. Measley** has been made Sales Manager of the company.

National Carbide Corp.—**George R. Milne** has been appointed Operating Manager and **Russell T. Lund** named Asst. Operating Manager.

Thermoid Co.—**Arthur Styron** has been appointed Manager of the Replacement Sales Div.

F & B Mfg. Co.—**Don McKim**, recently Executive Secretary of the National Standard Parts Assoc., is the new General Sales Manager of the company.

Motor & Equipment Mfg. Assoc.—Four new directors were elected to the association's Board—they are **W. S. Coles**, The Shaler Co.; **S. G. Phillips**, The Dole Valve Co.; **G. W. Sherin**, E. I. duPont de Nemours & Co. and **E. J. Wilcox**, J. H. Williams & Co.

National Standard Parts Assoc.—**Elmer Oleson, Jr.** has joined the Marketing Research Dept. of the Association.

National Bureau of Standards—**Dr. Newborn Smith** has been appointed Chief of the Central Radio Propagation Laboratory.

Newcomb-Detroit Co.—**Orrin E. Fenn** was appointed Chief Engineer of the Grand Rapids Div.

American Brake Shoe Co., American Brakeblok Div.—**Gordon A. Weller** has been made Asst. Manager of Replacement Sales and **Frank A. Colosimo** appointed Chief Service Engineer.

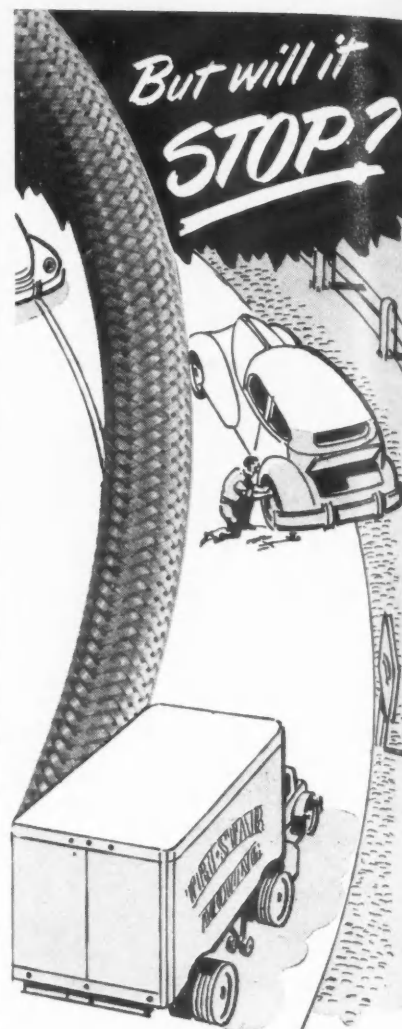
Scully-Jones & Co.—**Harry Conn** has been made Chief Engineer, to be in charge of the company's Engineering Div.

Koppers Co., Inc.—**Arthur B. Van Buskirk**, has been elected as a member of the Board of Directors.

Newgren Co.—**C. S. McIntyre** has been elected President to succeed **George M. Newin**, who has resigned to enter private business.

Visilite Distributors—Appointment of **George A. Robinson** as General Sales Manager has been announced.

The Euclid Road Machinery Co.—**V. L. Snow** has been promoted to Asst. Sales Manager. **R. M. Brown** succeeds Mr. Snow as Manager of the Sales Development Dept.



Titeflex Air Lines Insure Braking Safety

The air brake has probably done more to increase the safety of trucks and buses than any other device. But an air brake is only as safe as the air line with which it is equipped... that is why so many manufacturers have standardized on TITEFLEX tubing for their air brake lines. They know that because of its ALL-METAL construction, TITEFLEX flexible tubing will never rot or deteriorate and is practically a guarantee against air leaks.

Because of its long life and durability, TITEFLEX tubing is also highly favored for oil lines and gas lines in all types of automotive vehicles. TITEFLEX lines pay for themselves many times over in reduced maintenance costs and increased safety. Write for literature describing tough, durable TITEFLEX All-Metal flexible automotive lines—today.

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Exclusive Manufacturers of Titeflex high quality products for more than 30 years

Sales Offices: CHICAGO CLEVELAND DETROIT PHILADELPHIA
LOS ANGELES BOSTON SAN FRANCISCO TORONTO

7,200 Pieces
per hour

from 1 $\frac{1}{16}$ " x .042"
C.R.S. Coil Stock



... using

DANLY Precision Die Set

Tolerance of .001" held on 10-station progressive die

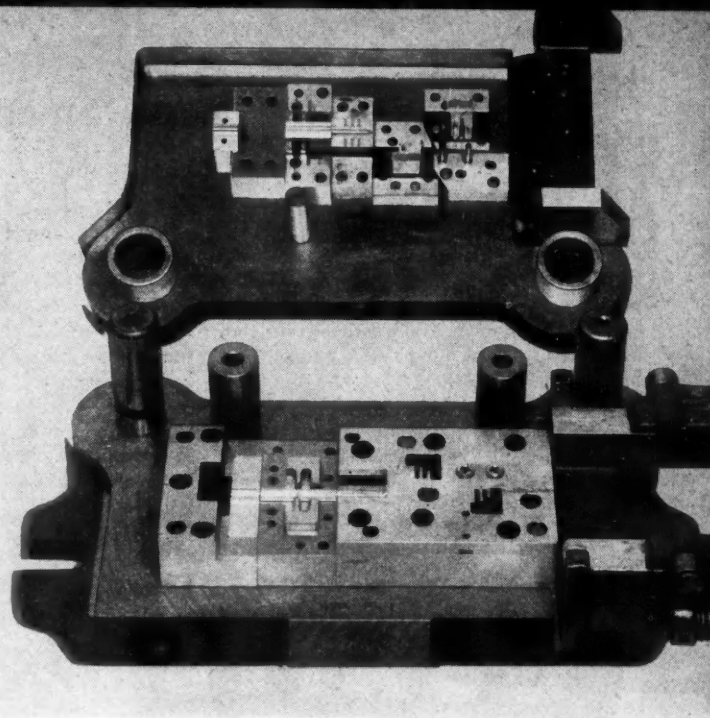


Photo courtesy of Federal Tool Corporation, Chicago

**save
time**

**USE DANLY NATION-WIDE
DIE SET ASSEMBLY SERVICE**

Assembly plants (marked with stars) stock interchangeable parts for quick assembly and delivery of any standard die set to your specifications.

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- * Cleveland 14, 1550 E. 33rd St.
- * Dayton 2, 990 E. Monument Ave.
- * Detroit 16, 1549 Temple Ave.
- * Grand Rapids, 113 Michigan Ave., N.W.
- * Long Island City 1, 47-28 37th St.
- * Los Angeles 54, Ducommun Metals & Supply Co., 4890 S. Alameda
- * Milwaukee 2, 111 E. Wisconsin Ave.
- * Philadelphia 44, 18 W. Chelton Ave.
- * Rochester 4, 16 Commercial St.

Here's another example of how Danly Precision Die Sets maintain close tolerance punch and die relationship on high production work.

The part illustrated, a nut chopper cutter, is produced on a 10-station progressive die at a rate of 7,200 pieces per hour. An average of 100,000 pieces are obtained between grinds. Tolerance of .001" between stations is maintained.

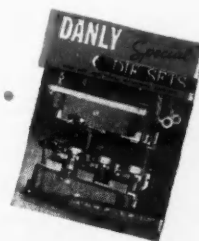
To date the same original Danly Die Set has held the tolerance required for a total of 1,500,000 pieces, and under normal operating conditions, will continue to give many more hours of profitable service.

SEQUENCE OF OPERATIONS—The roll stock is fed automatically through the following sequence of operations: (1) Pierce and notch right edge, (2) pilot, (3) notch left edge, (4) rough form center, (5) finish form center, (6) idle, (7) twist, (8) idle, (9) idle, (10) cut off.

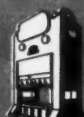
HELPFUL ENGINEERING SERVICE—For helpful engineering service on Die Sets of any size, standard or special, for any type of press operation, consult Danly without obligation.

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**25 YEARS OF DEPENDABLE SERVICE
TO THE STAMPING INDUSTRY**

PRECISION DIE SETS... STANDARD AND SPECIAL • MECHANICAL PRESSES AND PRESS EQUIPMENT

England's First Show Since 1937

(Continued from page 33)

models of lower horsepower having invaded the gasoline field. Gardner has a straight eight of 672 cu in. piston displacement, developing 140 hp. Perkins has a four of only 190 cu in., giving 46 hp. Meadows is up to 615 cu in., and has all drives taken from the flywheel end. Daimler has increased to 646 cu in., and Thornycroft has gone to 689 cu. in.

While there are no rear-engine, rear-

drive units, there is a tendency toward "under the floor" mountings, in a central position. Leyland has produced a flat six of 598 cu in. capacity, mounted centrally under the chassis and driving rearward. Plans have been laid for this to be used in a unit-construction, single decker bus built by Metropolitan-Cammell Carriage & Wagon Co. in conjunction with Weymanns for both home and foreign markets. Production is ex-

pected to start early in 1949. Sentinel is producing a flat six centrally mounted engine of 558 cu in. on a truck chassis. This engine was laid out as a horizontal unit and is not a conversion of the vertical to a flat position. An almost flat valve-in-head gasoline engine of 290 cu in. is built by Commer, the mounting in this case being in the usual forward position, with the steering gear fully forward and the driver above the engine.

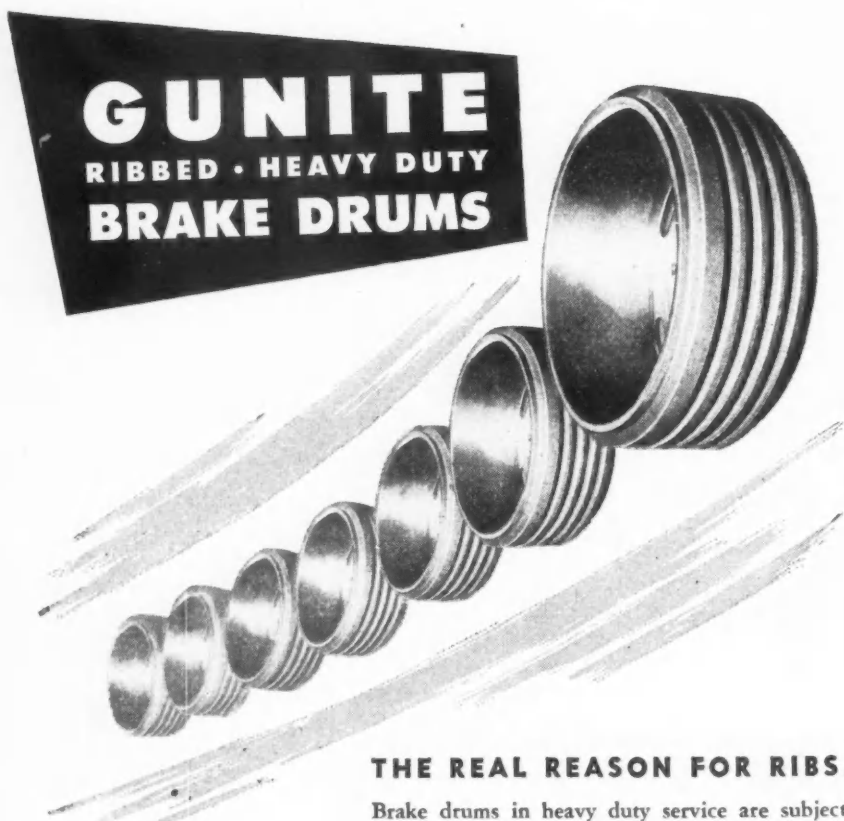
Automatic transmissions appear to be limited to the Salerni-Brockhouse used by Crossley on its bus chassis. The Wilson planetary type pre-selective gear is more extensively employed, being used on the A.E.C. Regent Mark III bus chassis, on the Daimlers, and by Guy. The fluid flywheel is used by all three firms in conjunction with this transmission. It is now the practice to operate this gear by air or oil, or a combination of the two, as presented by the Wilson Co., with a view to reducing driver fatigue to a minimum. The Fraser hydraulic clutch is not yet in production, but prototypes are being tested by about a score of manufacturers or operators. Five-speed transmissions are beginning to make their appearance either as an overdrive or an emergency low.

British practice is almost entirely wedded to an overhead or underslung worm type final drive. There are very few double-reduction axles, although some makers, notably Leyland, are producing a two-ratio axle.

Three axles are strongly in evidence for coach service, while for heavy haulage there is a considerable use of four-axle trucks, the two rear axles being positively driven and either one or both front axles being steerers. The Maudslay "Meritor" is an example. This four-axle, eight-wheel dual steering job, with an A.E.C. engine, has a gross weight of 22 tons. The rear axles are overhead worm type, with a third differential built into the first driving axle to equalize the driving load on all driving wheels. The trunnion type of rear bogie has very largely displaced the balance beam. Each axle has its own conventional semi-elliptic springs, pivoted on the frame at the front and rear extremities and connected at the inner ends by a short balance beam swinging on the frame. The Foden 15-tonner export model is another example of this practice, the truck being equipped with a constant-mesh, four-speed transmission of the helical gear and dog clutch type, to which a superlow fifth speed can be added.

Excellent work has been done in cleaning up equipment and improving accessibility. In nearly every case fuse boxes are mounted in an easily-reached position on the top of the engine housing, on the forward face of the bulkhead between cab and body, or on the rear face of the dash. It is also a common practice to mount air filters away

(Turn to page 76, please)



THE REAL REASON FOR RIBS...

Brake drums in heavy duty service are subject to severe flexing stresses imposed by the pressures of the shoes, tending to stretch the drum out of shape; and high temperatures, sometimes running to over 1000°. The characteristic ribs on GUNITE Brake Drums look like cooling fins but are not. Their purpose is (1) to stiffen the drum and hold it in shape against the shoe pressures, (2) to permit the use of thinner sections and thus reduce internal compressive and tensile stresses that produce "heat check", and (3) to permit axial expansion of the braking surface at high temperatures, further tending to prevent heat check and breakage. The GUNITE rib design was developed by hundreds of gruelling over-the-road tests and its effectiveness has been demonstrated by a thousand million miles of silent proof. Buy RIBBED Gunites for heavy duty braking!

Write for our new folder giving further information on the advantages of ribbed drums.



Time-Saving Equipment

is the answer to Lower Production Costs



equipment helps the

workman produce More with Less effort

Time and cost studies also prove this significant fact: Ingersoll-Rand Air Power equipment which, a few years ago, saved enough to pay for itself in 30 days, now pays for itself in only 18 days on the same operations under today's conditions,

To find out what this can mean to you, here is all you do . . .

Call your I-R branch office. Ask for an engineer who will work with your department heads in making a job study of your production operations. He will help you make actual Air Tool performance tests right on your own jobs in your plant. Then you can determine definitely how much you can save in production costs by using Compressed Air and Air Tools. You will know how soon the recommended equipment will pay for itself.



Ingersoll-Rand

11 Broadway, New York 4, N. Y.

England's First Show Since 1937

(Continued from page 72)

from the engine—in some cases on the top of the hood, in others inside the cab.

Light alloy construction has only a moderate following, probably owing to the fact that production is more important than new designs. The JNSN, an all-light-alloy chassis with a Perkins 70 hp six-cylinder engine, provides a loading platform of 23 ft by seven ft for a total weight of 5250 lb. With a van body of 1700 cu ft capacity, the

total weight is 7700 lb. Light alloy containers and truck bodies are shown by Duramin, while Metal Sections Limited displays coach bodies built up of light alloy frames to which sheet metal panels are riveted.

Although the show carries the title international, the exhibitors from abroad are far from numerous. Ford and Dodge vehicles are manufactured in England and therefore figure as British products. Chevrolet, Studebaker

and Reo were the firms showing American-built trucks, and these had only been admitted for show purposes. At the end of the exhibition they had to be sent back to the factory or exported. France was represented by Latil, Renault and Panhard. There were no other foreign exhibitors.

NEW PRODUCTS

(Continued from page 51)

AC or DC and is designed to give welds of 100,000 psi.

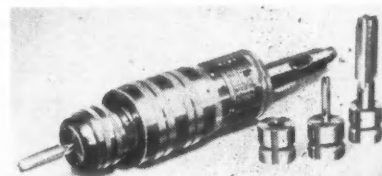
It is anticipated that the electrode will find a wide market in completely satisfactory fabrication of hardenable steels which are said to be susceptible to underbead cracking when conventional types of electrodes are used without preheat.

Air Reduction further disclose that the Airco 394 will act as the high-tensile companion electrode to Airco No. 312 which is used on mild steel to produce a tensile strength in excess of 60,000 psi.

P-98—Tapping Attachment

Designed specifically to eliminate costly tap breakage, a new type tapping attachment by the Wickman Mfg. Co., Detroit, Mich., is known as the "Jay-Dee."

Jay-Dee does not employ coiled springs to provide driving pressures. Instead, a resilient material, said to be 150 times more effective than spring steel, delivers a safe cutting torque and protects taps regardless of load. Jay-Dee can be used with all types of reversible machines, for horizontal or vertical tapping, for blind or through holes.



Wickman "Jay-Dee" tapping attachment

Four index stations, listed according to tap size on the body of the attachment, can be quickly selected and provide a positive setting for the widest variety of materials. Tap changing takes five seconds; no wrenches are required. Tap adaptors are supplied for various size taps and these adaptors are inserted in the Jay-Dee's master collet and held in place by spring buttons.

Jay-Dee is available in three models, all supplied with Morse Taper shanks. Model K-1, 16½ in. long and 16½ lb, and with a ½ in. —1¼ in. USS range, has three times the range of other tapping attachments. Model K-2, 13¾ in. long and 11 lb, covers ¾ in. —1¼ in. USS. Model K-3, 10 in. long and 3¾ lb, covers 3/16 in. —½ in. USS.

If you manufacture...

You can save 3 WAYS with...
Essex "Packaged" Wiring Harness

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Scores of manufacturers have found that they save *time, trouble and money* by turning their electrical wiring harness problems over to Essex specialists.

Essex One-Source service handles the intricate job of producing lighting, ignition and control harness assemblies *custom-built* to your exact specifications and *complete* with all manual and electrical control devices for quick, efficient installation.

Through intensive specialization in wiring harness assemblies, Essex has developed line production methods of manufacturing, assembly and inspection, for the economical production of high grade, individually tested, specially engineered assemblies.

Investigate Essex "One-Source" service today!



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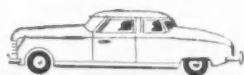
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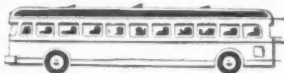
Automobiles



Trucks and Trailers



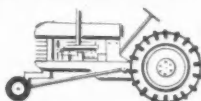
Busses and Trackless Trolleys



Industrial Electric Trucks

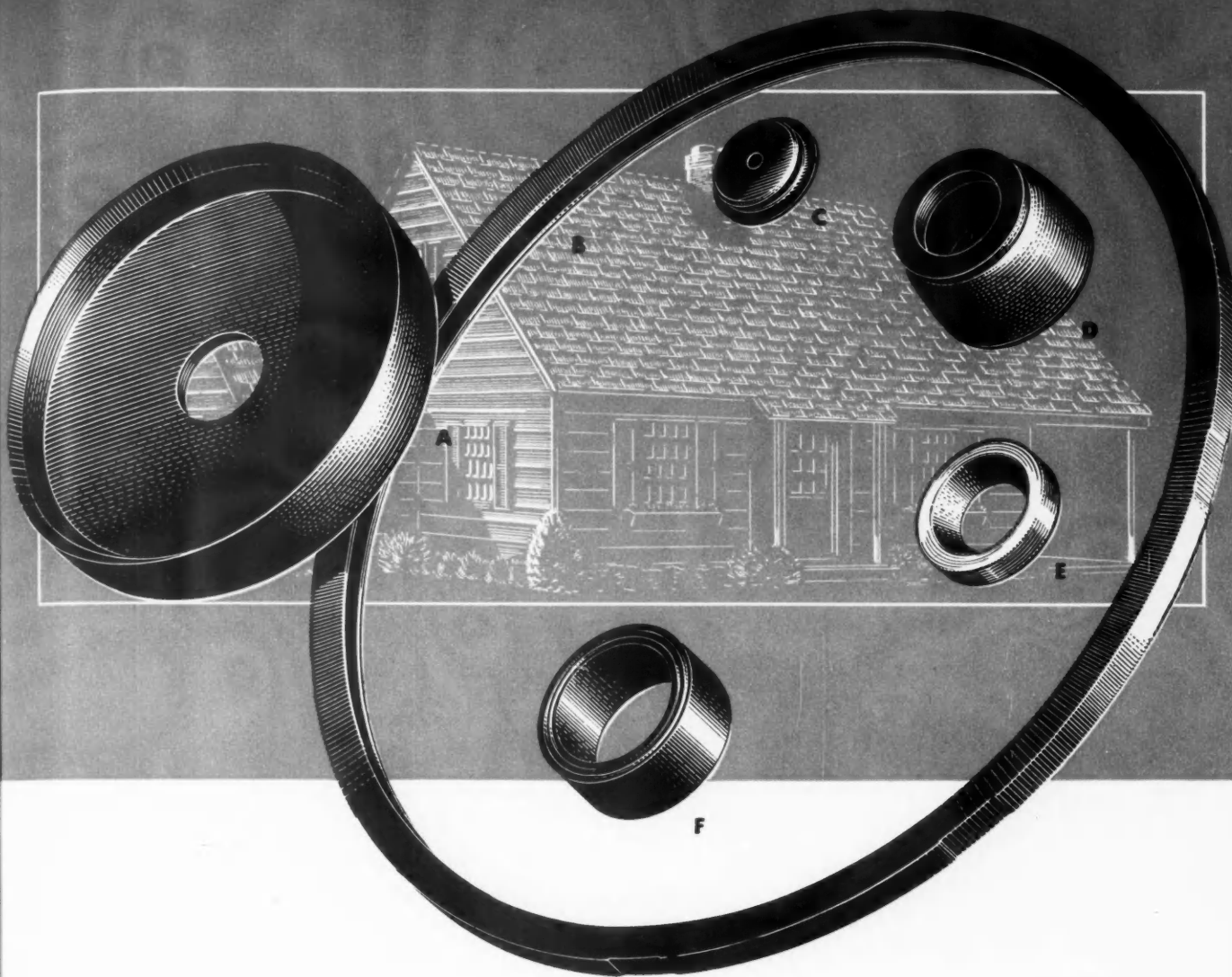


Tractors



Aircraft





HOW SIRVENE SERVES IN *The Home*

"A" is the air pump cup for a household paint sprayer. "B" is a safety gasket and "C" is a safety plug used on a pressure cooker cover. "D" seals a washing machine tub. Shaft seal "E" serves in the gear box on an automatic ironer. "F" is a water softener valve seat.

These are just a few of the many ways that Sirvene is used in the manufacture of home appliances. They offer another demonstration of Sirvene's versatility in application to a wide range of unusual or difficult mechanical problems.

Take the pressure cooker parts, for example. In all cases, Sirvene engineers deal with rigid specifications. These usually cover elasticity, tensile strength, resistance to heat, moisture and age, and many similar factors. But, for this gasket and plug two rare characteristics were necessary — the Sirvene compound had

to be *tasteless* and *odorless*. Complete safety under steam pressure was also required.

The successful solution of these home appliance problems offers a key to the ways in which Sirvene can serve you. If your product requires a unique molded pliable part, to give dependable performance under severe operating conditions, investigate Sirvene. Chicago Rawhide engineers will develop, compound and mold that part exactly to your specifications.

CHICAGO RAWHIDE MANUFACTURING CO.

1310 Elston Avenue SIRVENE DIVISION Chicago 22, Illinois

Sirvene products include diaphragms, boots, gaskets, oil seals, washers, packings, and other special molded mechanical pliables

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microhoned*

for: 20% to 40% more production

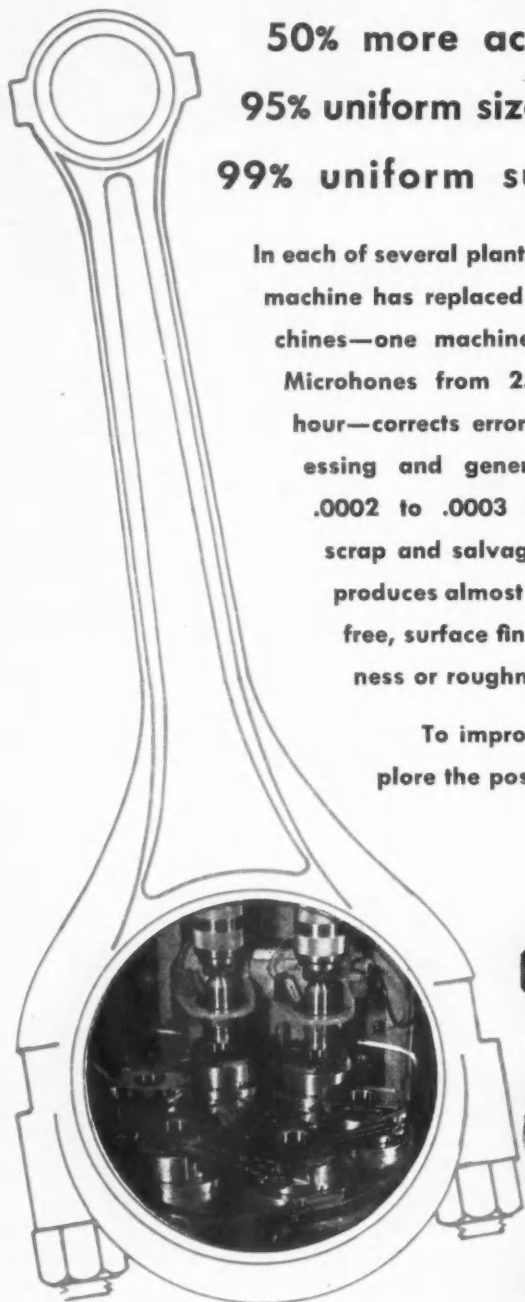
50% more accurate bearings

95% uniform size, fewer re-runs

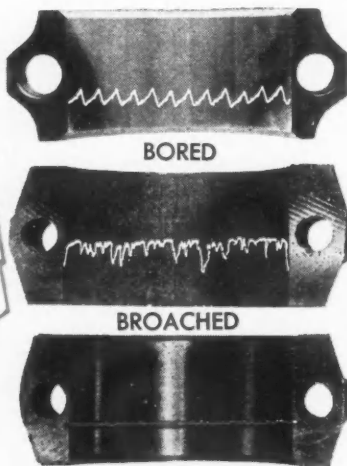
99% uniform surface finish

In each of several plants, one microhoning machine has replaced three grinding machines—one machine and one operator. Microhones from 250 to 400 rods per hour—corrects errors from previous processing and generates accuracy within .0002 to .0003 inch—reduces oversize scrap and salvage re-runs to within 5%—produces almost perfectly uniform, chatter-free, surface finish of any desired smoothness or roughness.

To improve your production, let's explore the possibilities now.



Six-station fixture for Microhoning two connecting rods simultaneously.



Comparison of Profilograph records of typical connecting rod machining operations.

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DISTRICT FIELD OFFICES:
55 George St.
Brantford, Ont.
Canada

Micromold Manufacturing Div.
Boston Post Road
Guilford, Conn.

1949 Cadillac Has V-8 Engine

(Continued from page 37)

cent less area than on the L-head engine, thus reducing heat rejection with increased compression ratios. Because control of form and size are exceedingly important, the combustion chamber is machined all over. The combustion chamber also allows more room for valves of generous size. Port diameter for intake valves is 1½ in., for exhaust valves 1 5/16 in., thus promoting greater breathing capacity. Spark plugs are of 14 mm size instead of the 10 mm plugs used before.

With its increased thermal efficiency the engine rejects about 20 per cent less heat at 70 mph and this is reflected in a reduction both in size and weight of the radiator. It is now only three rows of tubes deep—instead of four—and weight is down about 15 lb. Capacity of the cooling system is 18 qt.

A major improvement has been made in the fuel induction system to allow better breathing and mixture distribution. The dual down-draft carburetor with a newly designed, one-piece manifold is arranged for uniform distribution of the mixture. The manifold has shorter, larger diameter passages to facilitate free flow of the mixture. At the same time the oil bath air cleaner provides enlarged intake capacity.

Although it has been assumed that heavier structures are necessary to take care of the greater loading due to extremely high compression ratios, Cadillac has altered the picture materially by reducing the size and weight of highly stressed parts such as the rods and by suitable improvements in other directions. For example, the new crankshaft has been redesigned for five main bearings instead of three. It is shorter—because of the clearance afforded by the slipper pistons—lighter, and yet more rigid torsionally than the previous design. At the same time the lower end of the crankcase has been strengthened and stiffened by the introduction of heavy ribbed bulkheads which aid in producing a rigid box-like structure. The combination of the rigid crankshaft—free from torsional vibration—the rigid, light-weight valve system, and the rigid lower crankcase structure accounts for uncommon smoothness and quietness of operation at all speeds.

The same philosophy has been applied in other directions. For example, the piston structure is strong and rigid and the piston pin has been increased to one-in. diameter for added stiffness. The five main bearings and rod bearings are of the familiar Durex type.

Most of the weight saving has been effected through a reduction in cast iron, as may be surmised. The cylinder block is considerably lighter because of deliberate design effort coupled with much shorter cylinder bores. To this may be added the gain from making

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The development and application to springs of "shot-peening"—a method of surface treatment which raises the endurance limits of spring performance.

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Laboratory and mill experimentation resulting in a greater diversity of physical properties to meet varying service requirements, including a spring steel with exceptional uniformity and working properties.

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Introduction of special processes and methods to make springs for extreme requirements of use.

DESIGN INFORMATION

A spring-design manual which presents the results of engineering advances in all seven plants, after actual practice proves their merit.

Springs

Small Stampings

Wire Forms

Continuing spring research is high on the list of our future plans. Let it contribute to the improvement of *your* product.



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the upper section of the flywheel housing as a part of the crankcase upper structure. The oil pan, valve covers, tappet cover, and timing gear cover being of light stampings naturally contribute to lightness.

Among other significant details are the following — adoption of a flame-hardened steel camshaft sprocket in the timing chain drive and use of a very narrow timing chain; a single belt drive of narrow wedge type for all belt driven accessories; adoption of the familiar embossed steel head gasket; and use of the new Delco distributor which incorporates a radio interference

suppressor in the rotor. Another feature of the new distributor is the tapered driving end which fits into the slot of the unique distributor drive gear mounted at the camshaft. This gear and hub are cast in one piece of the same alloy cast iron material as is used for the camshaft, the gear being of large diameter to promote durability. The tapered connection is said to be effective in eliminating back-lash at the driving end.

From a service standpoint the new engine is said to be superior in affording accessibility, particularly with respect to accessories. For example, the

generator is mounted high on the right side of the block. The carburetor is at the top center; the fuel pump is at the front over the block. The ignition distributor and coil are mounted close together at the top rear end.

The development of a one-piece casting combining the water pump housing and inlet and outlet water manifolds eliminates all of the usual hose connections except those to the lower and upper radiator tanks. Coolant is circulated by the pump from the bottom of the radiator to the lower manifold, through the cylinder block and cylinder head water jackets, and out through the upper manifold to the top radiator tank. A by-pass in the casting between the upper and lower manifolds permits the coolant to recirculate through the cylinder block and heads until the proper temperature has been reached and the thermostat valve is opened.

With this powerplant some detail changes have been effected in the Hydra-matic drive. For one thing, the flywheel is lighter than before. In addition the fluid coupling has been altered in torus design to effect an increase in torque capacity. Detail changes also have been made in the control of the Hydra-matic unit to improve smoothness and operational efficiency. Of more than passing interest is the fact that the throttle valve control linkage to the Hydra-matic unit has been completely cleaned up and now consists of a single rod without any other joints or connections. Hydra-matic drive is continued as optional equipment on all models, although it was specified in 1948 by 98 per cent of Cadillac buyers.

So far as the chassis is concerned Cadillac has made many detail improvements and changes. The ride has been improved by the process of rebalancing the car now that there has been a shift in weight distribution, less weight at the front end in this case. The ride is softer and flatter due to changes in shock absorber valving and in spring rates. Steering is improved by the reduction in weight at the front, easing steering effort for parking. On the other hand, the change in weight distribution has made it necessary to increase braking at the rear and to this end the rear brake shoes and linings are ¼-in. wider than before.

The parking brake mechanism also has been improved to increase its effectiveness. In the process it has been simplified in linkage and now has less travel.

An important change in the rear axle is found in the adoption of axle shafts with the flanged end integral. At the same time the wheel bearings have been moved closer to the hub.

Cadillac offers this year an entirely new all-weather ventilating system. It consists of two underseat recirculating hot water heaters for lower area heating and a heater-defroster for upper area heating.



Power-Grip Holding Speeds Milling of Serrations

The job here is milling serrations on vise jaws. Work is held on a 20" Power-Grip Viking Chuck. Nineteen pieces are milled at a time and turned for cross serrations. Cutter is 4" dia. by 7¼". Spindle speed is at 78 r.p.m., and feed rate at 9" per minute.

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"Necked" Screws and Bolts

(Continued from page 43)

would serve no purpose, as it would merely reduce the maximum pressure which can be applied to the clamped part or parts.

"Necking" offers particular advantages in the case of connecting-rod bolts. These must be set up sufficiently tight so that the maximum load due to inertia and centrifugal forces cannot possibly equal the initial load. If that condition is met, the stress range in the bolt due to the engine cycle will be relatively small, and the bolt will have

a long fatigue life. This result could be assured also by using relatively large bolts, but that would lead to heavy construction, which is particularly undesirable in this case as it increases the load on the crankpin bearing. A properly necked connecting-rod bolt will permit practically the same preload as a standard bolt with the same thread, and it will give much better protection against failure due to "overtightening."

Connecting-rod and similar bolts gen-

erally are provided with castle nuts secured by cotter pins. It is, of course, quite likely that when such a nut is tightened the desired tension in the bolt is reached while the slots in the nut are out of line with the cotter-pin hole. In that case it is not advisable to loosen the nut to bring the slots into registry, as that would reduce the tension in the bolt and increase the operating stress range. The nut must be drawn up until the next pair of slots come into registry with the hole. This may require an additional tightening motion of nearly 60 deg, which might dangerously overstress a relatively short standard bolt, and it has been suggested that in such cases two cotter-pin holes be drilled through the bolt, 90 deg apart.

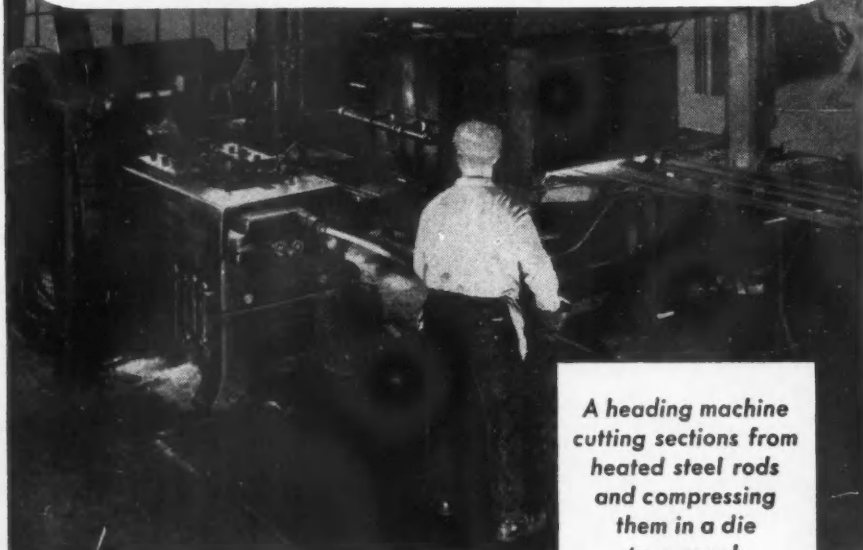
That "necked" connecting-rod bolts are not widely used in the automotive field probably is due to their higher costs. Such bolts do not seem to be a regular product of the screw-and-bolt industry, and if they have to be produced specially by the engine manufacturer their cost probably runs rather high. It is of interest to mention in this connection that practically the same effect as from "necking" of the screws can be obtained by drilling the screw axially, as shown in Fig. 4. In the case of a 9/16-18 screw an axial hole of 9/32-in. diameter will reduce the section of the shank slightly below that at the bottom of the thread. As already mentioned, for a certain bolt of approximately the diameter and pitch used for connecting-rod bolts, of automotive engines it was found that the point of fracture shifts from the thread to the shank when the diameter of the latter is reduced below 1.08 the minor diameter of the thread, and on this basis a 1/4-in. hole in the 9/16-in. screw would prevent fractures in the thread. The hole, of course, should be no larger than necessary to prevent such fractures, as the only effect would be to reduce the maximum safe tension or preload.

Trouble from over-tightening of screws and nuts has been widespread, especially where more or less unskilled labor is employed, and to reduce it the so-called torque wrenches were introduced. It was soon found, however, that these are not an absolute safeguard. The torque wrench may limit the maximum torque which it is possible to apply to the screw or bolt rather closely, but what has to be limited to prevent fracture is the tension which can be set up in the bolt, and this does not depend solely on the applied torque, but also on the fit of the threads, the relative smoothness of the contacting surfaces, and the conditions of lubrication. In a report of the SAE War Engineering Board on Torquing of Nuts in Aircraft Engines it was shown that when the bearing surfaces are copper-plated for purposes of lubrication, the bolt tension for a given wrench

(Turn to page 84, please)


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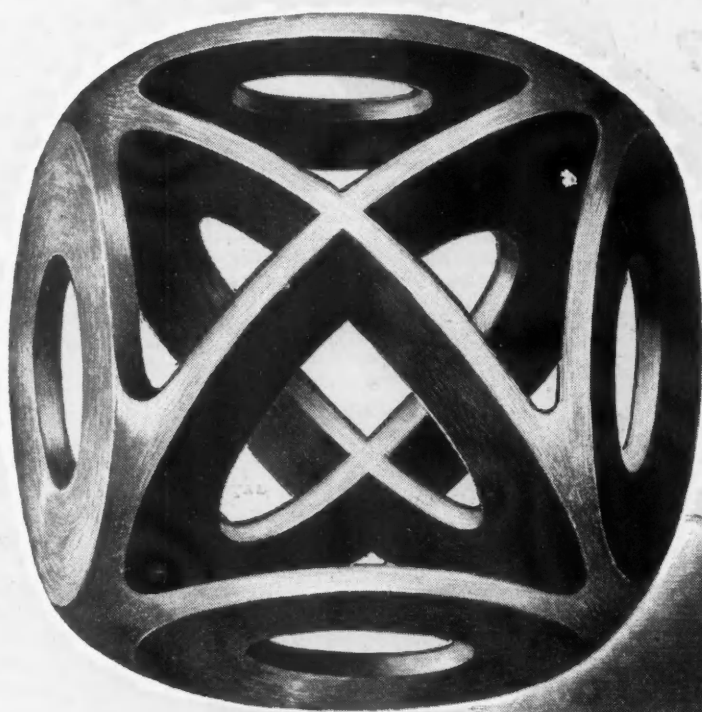


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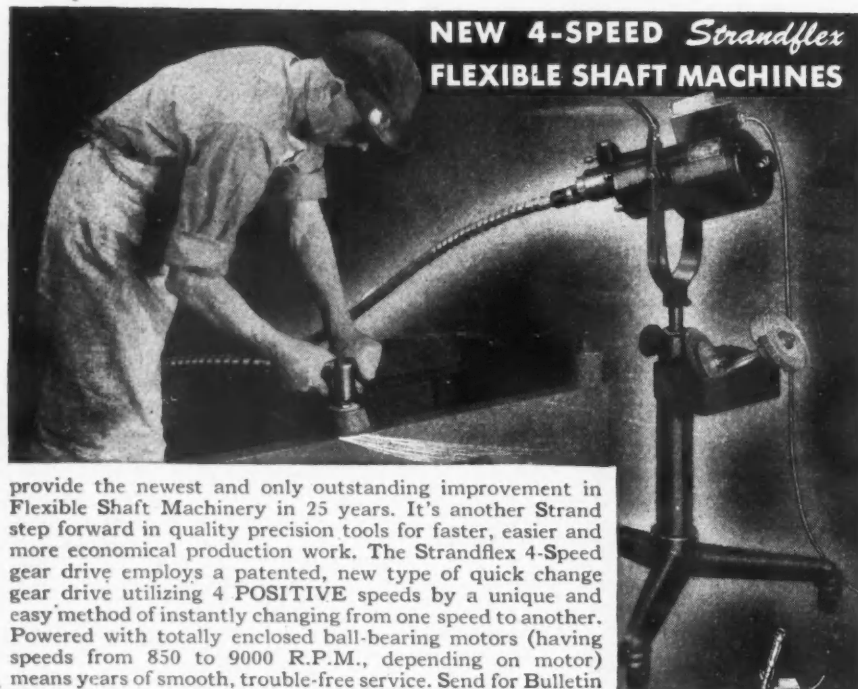
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torque may be more than ten times as great as when the parts are degreased and assembled dry. These, of course, are extreme conditions, but even in regular practice the ratio between wrench torque and bolt tension may vary over a range of three to one.

The study of the War Engineering Board led to the conclusion that the only way in which the tension in a screw or bolt can be measured accurately is by measuring the extension. Unfortunately, this can rarely be done, as one end of the screw or bolt usually is inaccessible. The extension measurement being inapplicable and the torque-measurement plan unreliable, it has been proposed that in assembling parts where the bolts or screws must be set up tight, the angular motion to be applied to the wrench after the parts are in firm contact be specified. The wrench motion necessary to ensure the desired preload could be determined experimentally in advance. There is some disagreement as to what is the limiting safe tension in the screw or bolt. The SAE War Engineering Board in its report set it at 80 per cent of the yield point of either the screw or the abutment, whichever is the lower, but Dr. Benz holds it to be safe to make it equal to the elastic limit. He says an investigation of the practice of competent mechanics in fastening counterweights to crankshafts showed that when the screws were loosened, they invariably were found to have elongated permanently, showing that they had been stressed beyond the yield point, yet the installations gave no trouble in service. When counterweight screws are loosened on an engine that has been in service for some time, they are found to contract elastically an amount corresponding to a stress equal to the elastic limit.

A competent mechanic usually has little trouble in setting up screws or nuts to the required point without risk of injuring them. This is due to the fact that as long as the stress is below the elastic limit the resistance to wrench motion varies practically in direct proportion to the motion. Beyond the elastic limit the resistance to wrench motion increases only slightly, if at all, as clearly shown by the intermediate one of the three stress-strain curves in Fig. 3.

Reference has been made to the use of "necked" studs for aluminum cylinder heads. In that case the greater elasticity of these studs is called for not only by the dynamic load due to the engine cycle, but also by the greater heat expansion of the aluminum casting as compared with that of the steel stud. "Necking" undoubtedly is of advantage also where long "through" studs are used to hold together a cylinder block, cylinder head and crankcase, or an engine block, a cylinder head and the main-bearing caps. An increase in the elasticity of the stud or bolt always increases the security of the assembly.

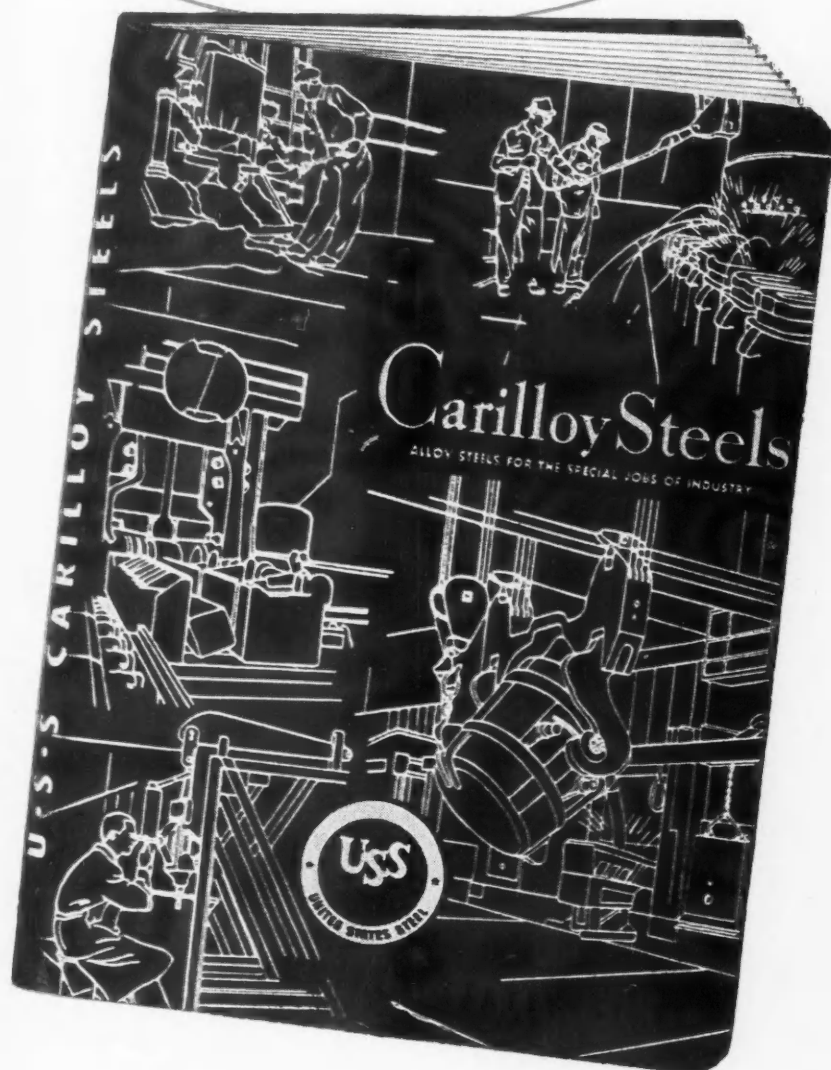
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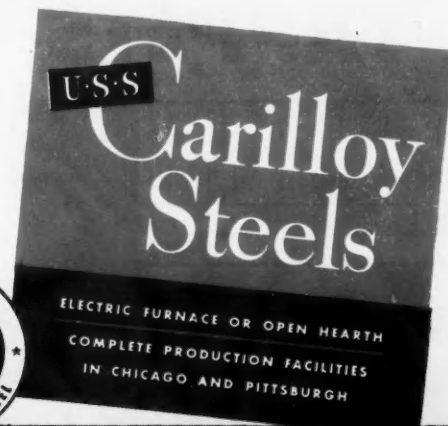
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UNITED STATES STEEL

How Tooling Problems Were Decided

(Continued from page 39)

and inasmuch as pay is only for loading, two operations were combined at this point, consisting of straddle milling all five main bearings and facing the end of the blocks to length. This machine turned out to be quite an institution. The combination of 10 cutters on an arbor for the straddle milling, with two large face mills having to work in the same area of the block, complicated the machine setup. After a lot of discussion with the sales engineers from the different milling machine companies

it was decided to load the block into a rise-and-fall fixture which would carry the block down into the straddle mill arbor for the bearing operation, return to its original position and lock, at which point two traveling heads carrying two large face milling cutters move out from the back and face both ends.

Quotations were received varying from \$28,000 to \$51,000. The \$51,000 machine was selected because of rigidity, a simplified control system with a minimum of electrical and hydraulic

gadgets, automatic clamping and unloading and a hydraulically actuated mechanical feed which was felt desirable to avoid vibration and chatter.

Fifth Operation—Drill all holes in cylinder head joint faces, machine tappet holes and distributor holes. Here again, the problem of labor involved in loading a series of operations to drill all the holes in question versus the cost of automatic machinery had to be carefully considered. The multiplicity of holes with their close center distances made it impractical to do this in less than five stations. In addition, it was felt that the expansion plug holes on the outside of the blocks could be done at the same time while working on the top faces.

After consideration of this problem with the sales engineers representing six drilling machine firms, a six-station automatic transfer type machine was selected. Six stations resulted largely because of limits of alignment and accuracy required in the distributor hole and tappet holes. This determined the number of stations and the other holes were advantageously placed in the six stations. The maximum number of spindles in any one station is 56.

In any piece of equipment as complicated as this, reliability in service becomes one of the most important factors. Accordingly, much time was spent in detailed discussions with the various sales engineers regarding their features of control, transfer mechanism, head construction and fixture design.

Basically, transfer type drilling machines are divided roughly into two types. First is the type in which all stations are controlled electrically from a control panel board. This entails an extremely complicated wiring setup which means that, if failure does occur, the job of tracing the trouble may be difficult and time consuming. It also means that failure in one station means shutting down the entire machine until the trouble is fixed. The second type of machine is one in which each station is an integral unit with its own independent electric and hydraulic system. Obviously, this type of construction is considerably more expensive for a multiple station setup. The advantages, however, are ease of servicing, because if failure in one station occurs the trouble must necessarily be in that same station. Furthermore, the other stations can be operated with one station out of service. A further advantage in case of model changes is that this type of construction makes it possible to open the line and add or remove stations without disturbing those remaining in service. For the machine in question, this type of construction represented a 30 per cent increase in initial cost on a quarter million dollar investment.

In reviewing service operating cost very carefully, it was decided that, over a period of years, the additional expen-

(Turn to page 88, please)

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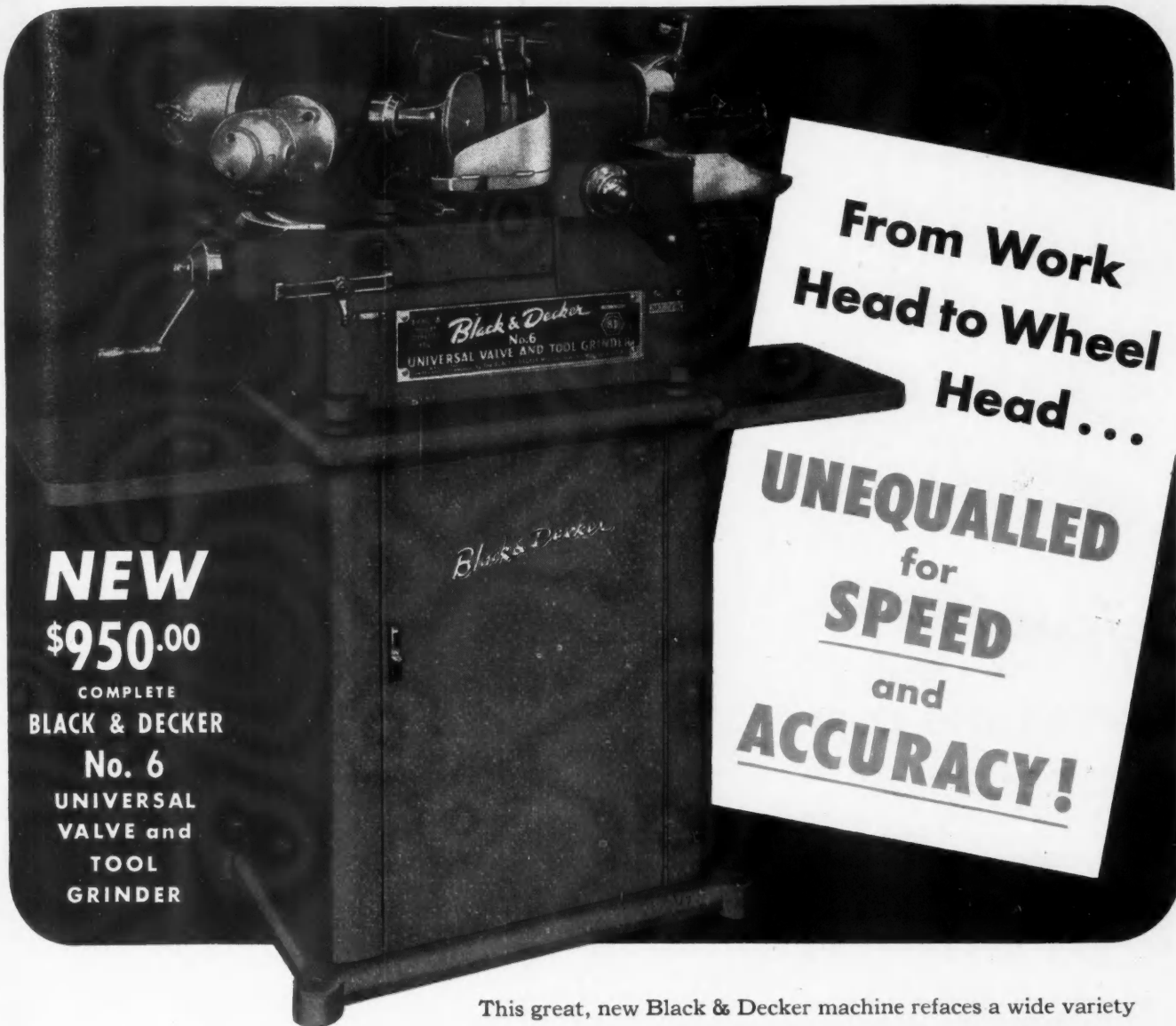
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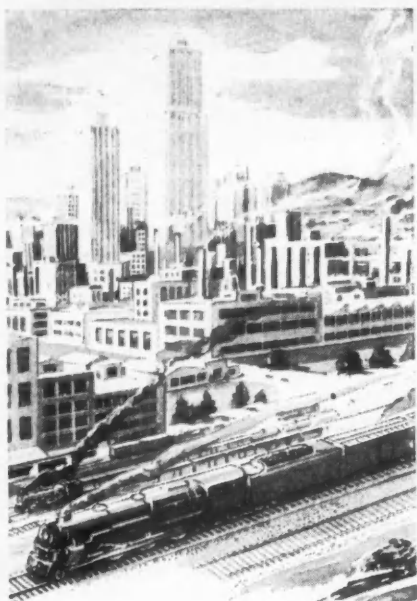
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diture was justified and the unit type construction was selected. Also, the operations done in this machine are, from past experience, the ones most likely to be affected by model changes. All stations in this machine are substantially the same in that hydraulic elements, electric components and fixture components are interchangeable. This greatly reduces the number and type of spare parts required for maintenance. Also, the maintenance problem is simplified due to the fact that knowledge with one station is applicable to all stations.

Sixth Operation—Drill and tap heads of cylinder block. In this operation the manufacturer's reputation for building good tapping equipment had a great deal to do with selection, in addition to the fact that the sales engineer did a good job pointing out improvements over previous equipment. Prices ran from \$18,000 to \$55,000. The \$55,000 machine was purchased.

Seventh Operation—Broach bearing blocks. For this operation, there was purchased an exact duplicate, except for fixture, of a machine that had given satisfactory service on the same operation in the preceding model block for 12 years.

Eighth Operation—Rough and semi-finish cylinder bores. Existing equipment duplicated.

Ninth Operation—Chamfer cylinder bores. Existing equipment duplicated.

Tenth Operation—Finish bore cylinders. Existing equipment duplicated.

Eleventh Operation—Hone the cylinders. Existing equipment duplicated.

Twelfth Operation—Tap holes in top and cylinder head faces. Existing equipment duplicated.

On the last six operations, where existing equipment was duplicated, competitive equipment was checked for improvements, but in each case, because the maker of the existing equipment had kept up-to-date it was felt that duplication was warranted.

Thirteenth Operation—Rough and semi-finish bore crank and cam line bearings.

Due to the fact that the new block has five main bearings rather closely spaced, it was found that sufficient room was not available for offset boring heads. This made it necessary to consider a line or bar type boring machine. The machine selected for this operation is a six-station automatic transfer machine for both cam and crank line, and in addition simultaneously drill two parallel oil galley holes running longitudinally through the block and counterbores them at both ends.

(Turn to page 90, please)

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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946

Of AUTOMOTIVE INDUSTRIES, published semi-monthly at Philadelphia 39, Pa., for October 1, 1948.

State of Pennsylvania } ss.
County of Philadelphia

Before me, a Notary Public in and for the State and county aforesaid, personally appeared G. C. Buzby, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the AUTOMOTIVE INDUSTRIES and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily, weekly, semi-weekly or tri-weekly newspaper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the act of August 24, 1912, as amended by the acts of March 3, 1933, and July 2, 1946 (section 537, Postal Laws and Regulations), printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Chilton Company, Chestnut and 56th Sts., Philadelphia 39, Pa.; Editor, Julian Chase, 5601 Chestnut Street, Philadelphia 39, Pa.; Managing editor, None; Business Manager, G. C. Buzby, East Sunset Ave., Chestnut Hill, Philadelphia 18, Pa.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) Chilton Company, Chestnut and 56th Sts., Philadelphia 39, Pa.

Holders of more than 1% of the capital stock outstanding of Chilton Company: Estate of C. A. Musselman, 260 Sycamore Avenue, Merion Station, Pa.—Beneficiaries: Mabel M. Musselman, Mary M. Acton, David Acton; Charlotte M. Terhune, 160 E. 48th Street, New York, N. Y.; C. S. Baur, Thomas Jefferson Apts. No. B-51, 49-11 Yellowstone Blvd., Forest Hills, New York; Mrs. Beulah Fahrendorf, 59 Drake Road, Scarsdale, N. Y.; Mary M. Acton, 260 Sycamore Ave., Merion Station, Pa.; Mabel M. Musselman, 260 Sycamore Ave., Merion Station, Pa.; Dorothy S. Johnson, 1115 Fifth Ave., New York, N. Y.; Ann E. Tomlinson, c/o Bankers Trust Company, P. O. Box 704 Church Street Annex, New York, N. Y.; Ethel G. Green, Trustee u/w of Charles W. Anderson, Old Greenwich, Conn.—Beneficiaries: Robert C. Anderson, Percival E. Anderson, Charles W. Anderson, Jr., Annie L. Clark; John Blair Moffett, 1608 Walnut Street, Philadelphia, Pa.—Agent for J. Howard Pew, J. N. Pew, Jr., Mabel P. Myrin, Mary Ethel Pew; Elizabeth J. Bailey and Ellwood B. Chapman, Trustees Estate of James Artman, Deceased, 930 Real Estate Trust Building, Phila., Pa.—Beneficiaries: Franklin Artman, Vera Waters, Alvin C. Artman, Elizabeth J. Artman, Marion A. Pratt, George H. Pratt, by assignment, Edwin Moll, by assignment; Frederick S. Sly, 149-40 35th Ave., Flushing, L. I., N. Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is (This information is required from daily, weekly, semi-weekly, and tri-weekly newspapers only.)

G. C. BUZBY, Pres. & Bus. Mgr.

Sworn to and subscribed before me this 17th day of September, 1948.

PHILIP J. SHIRE, JR.

(My commission expires January 7, 1951.)

[SEAL.]

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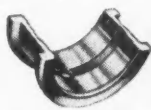
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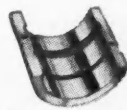
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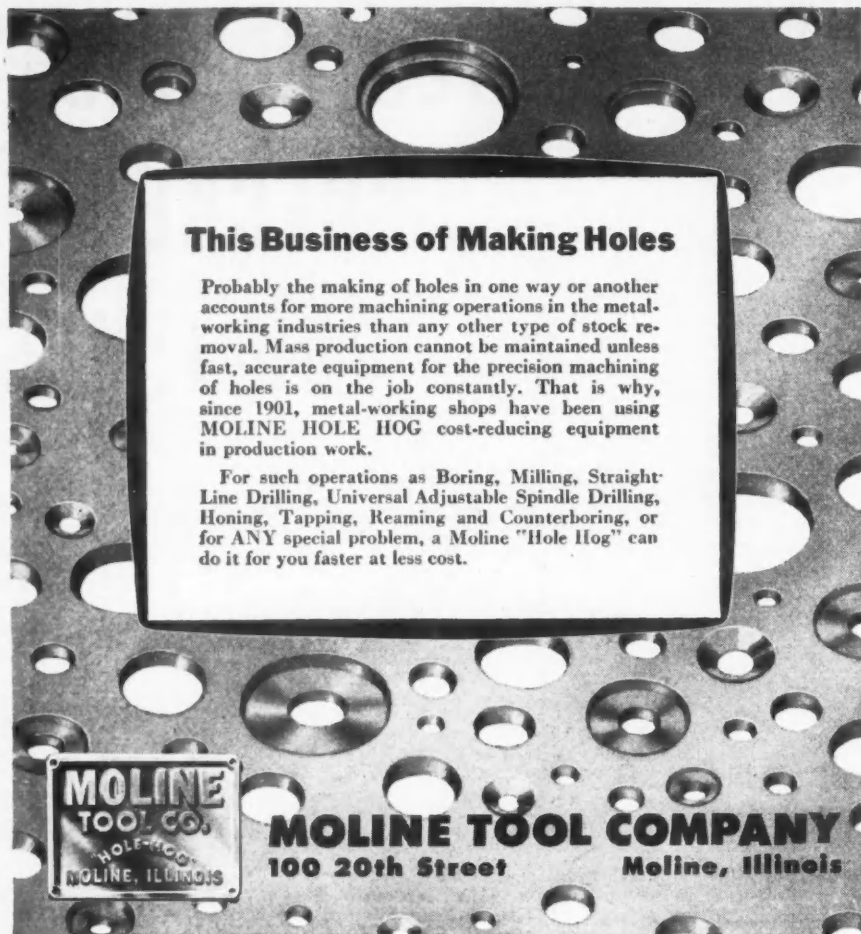
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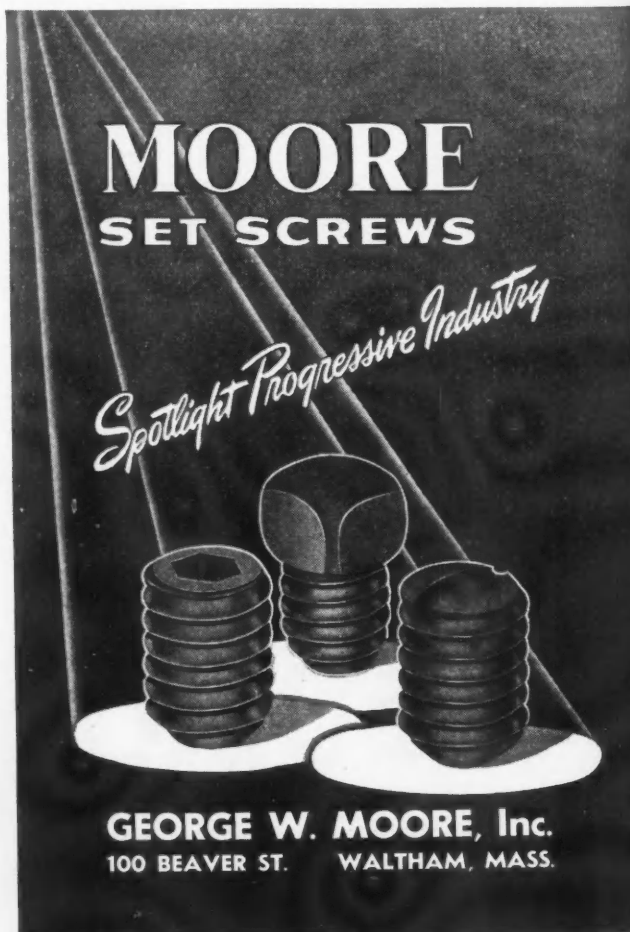
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